U.S. Department of the Interior
Bureau of Land Management

Carson City Field Office
Carson City, Nevada

October 2005

FINAL

EIS

Environmental Impact Statement

North Valleys Rights-of-Way Projects

Fish Springs Ranch, LLC
Intermountain Water Supply, Ltd.

MISSION STATEMENT

The Bureau of Land Management is responsible for the stewardship of our public lands. It is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people for all time. Management is based upon the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation, rangelands, timber, minerals, watershed, fish and wildlife, wilderness, air and scenic, scientific and cultural values.

BLM/CC/ES-05/022+2800

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Carson City Field Office
5665 Morgan Mill Road
Carson City, Nevada 89701
http://www.nv.blm.gov

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In Reply Refer To:
2800 (NV030)

October 2005

Dear Reader:

Enclosed for your review is the North Valleys Rights-of-Way Projects Final Environmental Impact Statement (EIS) that evaluates separate rights-of-way applications to construct and operate water transmission pipelines across public land administered by Bureau of Land Management, Carson City Field Office (BLM). Cooperating agencies for this Final EIS include: U.S. Fish and Wildlife Service; U.S. Bureau of Indian Affairs; U.S. Geological Survey; Sierra Army Depot; Pyramid Lake Paiute Tribe; Susanville Indian Rancheria; California Department of Water Resources; California Department of Fish and Game; Lassen County, CA; Washoe County, NV; Truckee Meadows Water Authority; Truckee Meadows Regional Planning Agency; Airport Authority of Washoe County; City of Reno; and City of Sparks.

BLM compiled a Draft EIS that analyzed separate plans of development submitted to BLM by Fish Springs Ranch, LLC and Intermountain Water Supply. The Draft EIS was released to the public on May 20, 2005 with publication of a Notice of Availability (NOA) in the Federal Register. The NOA initiated a 60-day public comment period ending on July 20, 2005. BLM received comments on the Draft EIS through 26 letters, emails, and written comments provided during public meetings. BLM reviewed the comments and provided written responses in this Final EIS. Some comments resulted in modifications to text in the EIS. This Final EIS is a "full text" document that contains the entire EIS and supersedes the Draft EIS.

Although water rights, pumping rates, volume of water proposed for transfer annually to the North Valleys area, and point of use of water proposed for transport across public land are under the purview of the Nevada State Engineer and outside the jurisdiction of BLM, these issues have been included in this document. Water distribution and use associated with development of the North Valleys area resulting from importation of water has been addressed by local and regional planning agencies in accordance with Nevada statutes. Appendix D is the *Recommended Water Resources Monitoring and Management Plan* that was developed in consultation with the cooperating agencies and will be transmitted to the Nevada State Engineer for consideration.

Comments will be accepted during a 30-day period and should be sent to:

Bureau of Land Management
Carson City Field Office
Attn: Terri Knutson, EIS Project Manager
5665 Morgan Mill Road
Carson City, NV 89701
FAX: (775) 885-6147, E-mail: nvalleyswater_eis@blm.gov

BLM will issue two records of decision (ROD); one for each of the proposed Projects. The RODs will not be issued until other agency permits have been finalized and their conditions of approval will be incorporated into the ROD. For more information, please contact Terri Knutson at (775) 885-6156.

Sincerely,

Donald T. Hicks

Donald T. Hicks
Manager, Carson City Field Office

FINAL
ENVIRONMENTAL IMPACT STATEMENT
NORTH VALLEYS RIGHTS-OF-WAY PROJECTS

LEAD AGENCY:	U.S. Department of the Interior Bureau of Land Management Carson City Field Office
COOPERATING AGENCIES:	U.S. Fish and Wildlife Service; U.S. Bureau of Indian Affairs; U.S. Geological Survey; Sierra Army Depot; Susanville Indian Rancheria; California Department of Water Resources; California Department of Fish and Game; Lassen County, California; Washoe County, Nevada; Truckee Meadows Water Authority; Truckee Meadows Regional Planning Agency; Airport Authority of Washoe County; City of Reno; City of Sparks, and Pyramid Lake Paiute Tribe.
PROJECT LOCATION:	Washoe County, Nevada
COMMENTS ON THIS FINAL EIS SHOULD BE DIRECTED TO:	Ms. Terri Knutson EIS Project Manager Carson City Field Office 5665 Morgan Mill Road Carson City, NV 89701 Fax: (775) 885-6147
DATE FINAL EIS FILED WITH EPA:	October 2005
DATE BY WHICH COMMENTS MUST BE POSTMARKED TO BLM:	November 2005

ABSTRACT

This Final EIS analyzes potential impacts associated with installation of water pipelines across public land administered by BLM. Rights-of-way applications for the water transmission pipelines (Projects) were submitted by Fish Springs Ranch, LLC and Intermountain Water Supply Ltd. to the Carson City Field Office. Each company is proposing to construct and operate water supply and transmission projects to meet present and future water demands of the Stead/Lemmon Valley Areas (encompassed by the North Valleys Area Plan) in Washoe County. The proposed Projects consist of installation and operation of wellheads, electrical distribution lines, electrical substation, water pipelines, pump stations, surge tanks, and a terminal water storage tank. Alternatives to the Proposed Actions are analyzed in the EIS. The Agency Preferred Alternative is Alternative A – Construct Pipelines within Common Right-of-Way. This Final EIS also provides responses to comments received by BLM on the Draft EIS. The public comment period on the Final EIS will close 30 days after publication of the Notice of Availability in the Federal Register.

Responsible Official for EIS:	Donald T. Hicks Manager, Carson City Field Office Bureau of Land Management

FINAL
ENVIRONMENTAL IMPACT STATEMENT
NORTH VALLEYS RIGHTS-OF-WAY PROJECTS

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SUMMARY

Fish Springs Ranch LLC and Intermountain Water Supply LTD submitted separate right-of-way applications to construct and operate water transmission pipelines across public land administered by the Bureau of Land Management (BLM) Carson City Field Office. Portions of the respective Projects would be located in whole or in part on public land administered by BLM; such operations must comply with BLM regulations for activities on public land, Title 43, Code of Federal Regulations, Part 2800, Rights-of-Way Program, and the Federal Land Policy and Management Act of 1976. In response to the potential for the proposed Projects to result in significant environmental impacts, BLM determined that an Environmental Impact Statement (EIS) would be necessary, as required by the National Environmental Policy Act of 1969 (NEPA). Due to similar timing, geography, and type of actions, BLM has determined that the two proposals would be analyzed in this one EIS.

This Final EIS describes the Proposed Actions and Alternatives (including No Action Alternative), and environmental consequences that could result from implementation of these actions. Potential direct, indirect, and cumulative effects on the environment are analyzed. Impacts described in this EIS will form the basis for a BLM Records of Decision (ROD) regarding the Proposed Actions, Alternatives, and selection of appropriate mitigation measures. The RODs will not be issued until necessary permits have been obtained and requisite consultations have been completed.

SUMMARY OF PROPOSED ACTIONS

Fish Springs Ranch and Intermountain Water Supply are two independent water companies proposing projects in Washoe County, Nevada generally located approximately 15 to 35 miles north of Reno, Nevada. Each company is proposing to construct and operate water supply and transmission projects to meet present and future water demands in the Stead/Lemmon Valley Area encompassed by the North Valleys Area Plan in Washoe County. The proposed Projects consist of installation and operation of wellheads, electrical distribution lines, water pipelines, pump stations, surge tanks, and a terminal water storage tank. Fish Springs Ranch's proposed Project would involve construction of an electrical substation on private land adjacent to the Alturas 345 kV transmission line in Honey Lake Valley. Intermountain Water Supply's proposed Project includes installation of wells and construction of a pump station and storage tanks on public land.

Operation, maintenance, and termination of the proposed facilities may ultimately become the responsibility of the water purveyor – Washoe County Department of Water Resources or Truckee Meadows Water Authority – after project construction is completed and the systems certified.

The Fish Springs Ranch proposal would convey up to 8,000 acre-feet per year (af/yr) from six wells located on Fish Springs Ranch property. The proposed pipeline would proceed south approximately 28 miles from the pump station to the terminal tank site between Lemmon Valley and Antelope Valley. The Intermountain Water Supply proposal would convey up to 2,500 af/yr from seven wells (five located in Dry Valley and two in Bedell Flat). The proposed Intermountain Water Supply pipeline would parallel the Fish Springs Ranch pipeline in portions of Dry Valley, Bedell Flat, and Antelope Valley and proceed south approximately 24 miles to a terminus near Stead.

ISSUES SUMMARY

Issues identified during public scoping and agency review of the Proposed Actions include:

- Potential impacts to surface and groundwater resources from proposed pumping of groundwater in Honey Lake Valley, Dry Valley, and Bedell Flat;

- Potential direct and indirect effects to vegetation and wildlife resources from proposed groundwater extraction; and

- Cumulative effects of water importation on regional development and past, present, and future reasonably foreseeable future actions.

Water distribution and use associated with development in the Stead/Lemmon Valley Area resulting from importation of water have been addressed by local and regional planning agencies in accordance with Nevada statutes.

WATER RIGHTS AND USE

Water rights, pumping rates, volume of water proposed for transfer to the Stead/Lemmon Valley Area, and point of use of water proposed for transport across public land are outside the jurisdiction of BLM. Water rights and pumping rates are under purview of the Nevada State Engineer. The State Engineer has addressed issues surrounding groundwater withdrawal from Honey Lake Valley, Dry Valley, and Bedell Flat during hearings associated with application for the respective water rights. Development of the Stead/Lemmon Valley Area associated with importation of water has been addressed by local planning agencies in accordance with Nevada statutes. Facilities, services, and development plans have been previously authorized by local governments and affected entities through adoption of the Truckee Meadows Regional Plan.

Fish Springs Ranch has groundwater rights in the amount of approximately 14,000 af/yr that originated from irrigation permits issued in eastern Honey Lake Valley. Of this amount, the State Engineer has authorized inter-basin transfer of 13,000 af/yr for use in the Stead/Lemmon Valley Area. Intermountain Water Supply has secured water use and inter-basin transfer rights for 3,000 af/yr in Dry Valley, of which, Intermountain Water Supply is proposing to transfer 2,000 af/yr from Dry Valley under their Proposed Action. Intermountain Water Supply applied for water rights totaling 500 af/yr in Bedell Flat. The Nevada State Engineer has approved a water right of 144 af/yr for Intermountain Water Supply in Bedell Flat. Intermountain Water Supply has reapplied to the State Engineer for the remaining 356 af/yr and the application is pending at this time.

PROJECT ALTERNATIVES

Issues raised during public scoping and agency review of the Proposed Actions were used to identify potential impacts that could result from the proposed Projects. Potential effects that were identified for the pipeline rights-of-way relate to short-term loss of soil productivity and vegetation resources during the construction period.

Two alternatives to the Proposed Actions were evaluated in this Final EIS: Alternative A - Construct Pipelines within Common Right-of-Way; and No Action Alternative. These alternatives represent a reasonable range of alternatives to the proposed North Valleys Rights-of-Way Projects.

SUMMARY OF IMPACTS

Analysis of potential impacts and mitigation associated with the proposed North Valleys Rights-of-Way Projects is presented in Chapter 4 – *Consequences of Proposed Actions and Alternatives.* The following is a summary of potential impacts, by resource, resulting from the Proposed Actions and Alternatives. Where potential impacts associated with the Proposed Actions are unique to either Fish Springs Ranch or Intermountain Water Supply's proposed Projects, the description of those impacts are distinguished. Where potential impacts are common to both proposed Projects, no distinction is noted.

PROPOSED ACTIONS

GEOLOGY, MINERALS, AND PALEONTOLOGY

Construction and operation of water transmission pipelines as described in the Proposed Actions would not result in impacts on geological resources, minerals, or paleontological resources of the Projects Area. Although construction activities may result in loss or destruction of fossils, rock formations in this region of Nevada are not known for containing significant (vertebrate) paleontological resources. If rare plant, vertebrate, or invertebrate fossils are discovered during construction, BLM would be contacted to determine steps necessary to preserve the fossils. Seismic hazards could cause a rupture or failure of the pipelines or damage to related facilities but would not present a threat to public safety.

AIR RESOURCES

The Proposed Actions include the Fish Springs Ranch and Intermountain Water Supply proposals for construction of wells, water transmission pipelines, and associated components. In addition, the Fish Springs Ranch Proposed Action includes construction of an electrical substation on private land adjacent to the Alturas 345 kV transmission line. Construction activities would generate temporary emissions consisting primarily of fugitive dust (particulate matter) and gaseous engine emissions from drill rigs, construction equipment, and vehicles. Fugitive dust and gaseous emissions from the Proposed Actions would be emitted at or near ground level, would be short duration (during the construction period), and would not have the potential to affect air quality or visibility in any Class I areas.

WATER RESOURCES

The Fish Springs Ranch Proposed Action would pump and convey groundwater at the rate of 8,000 af/yr from Honey Lake Valley. The Intermountain Water Supply Proposed Action would remove 2,000 af/yr of groundwater from Dry Valley and 500 af/yr from Bedell Flat. Water from the wells would be transported in buried pipelines to the Stead/Lemmon Valley Area north of Reno/Sparks.

General types of surface water impacts that may occur include: temporary disturbance of drainages during construction of the buried water transmission pipelines; accidental releases of hydraulic fluid, fuel, or oil; and reduced stream flow where groundwater drawdown from production well pumping is connected to surface water (e.g., springs and seeps). Potential impacts to groundwater from the

Proposed Actions include: temporary and localized disturbance to areas of shallow groundwater intercepted by pipeline trenching; creating a groundwater cone-of-depression around the pumping wells in each basin; lowering the groundwater table in each basin; localized land subsidence caused by lowering groundwater levels; and changes in salinity or total dissolved solids resulting from groundwater movement induced by the pumping wells.

Distribution and use of water from the proposed pumping wells could increase: groundwater recharge from septic systems; nitrate loading in groundwater; erosion/sedimentation from housing and business development projects; and surface water runoff due to buildings and paved areas.

SOIL RESOURCES

The Fish Springs Ranch Proposed Action would result in approximately 395 acres of surface disturbance from installation of about 38 miles of water transmission pipeline, wells, pump station, storage tanks, and an electrical substation. The Intermountain Water Supply Proposed Action would involve about 241 acres of surface disturbance from installation of 24 miles of water transmission pipeline, wells, pump station, and storage tanks.

Portions of the pipeline routes included in the Proposed Actions would occur adjacent to previously reclaimed land associated with the Tuscarora Natural Gas Pipeline. Potential impacts to soil resources include modification to chemical and physical characteristics. These impacts are expected to be minimized, to the extent possible, following reclamation. Loss of soil and short-term interruption of natural soil processes and functions would be reversed by natural soil development over time.

VEGETATION RESOURCES

The Fish Springs Ranch and Intermountain Water Supply proposed Projects would have short-term direct affects to sagebrush, grassland, and juniper woodland communities during construction of the respective water transmission pipelines. Vegetation communities would be permanently removed during construction of wellheads, pumping stations, storage and surge tanks, and an electrical substation. Disturbance of existing vegetation would increase potential for noxious weeds and other invasive species to proliferate and spread to adjacent undisturbed areas.

No sensitive species or plants listed under the Endangered Species Act would be affected by the proposed Projects. Cacti protected under Nevada law would be salvaged and replanted in undisturbed habitats.

Approximately 70 non-wetland drainages would be crossed by the proposed water transmission pipelines. Assuming a construction width of 50 feet and length of 10 feet for each drainage crossing, less than 1.0 acre of non-wetlands waters of the U.S. would be affected by construction of the proposed pipelines. Short-term disturbance to the channels bed and bank would occur during construction activities.

Some wetland habitat areas within the groundwater drawdown zone of influence could be reduced or eliminated as a result of lowered groundwater levels and/or reduced flow from springs. The magnitude of impact, if any, is difficult to quantify because of uncertainty determining the water source for each spring and wetland area.

WILDLIFE RESOURCES

Direct impacts to wildlife resources resulting from the Proposed Actions would be short-term loss of habitat and displacement or loss of wildlife as a result of construction activities. Construction of permanent above-ground facilities would remove habitat and displace wildlife. Most wildlife species in the Projects Area are associated with sagebrush and grassland communities and juniper woodlands. Construction of well heads, pump stations, storage tanks, and an electrical substation would result in approximately 10 acres of permanent habitat loss associated with the Fish Springs Ranch Project and 1.0 acre of habitat loss with the Intermountain Water Supply Project.

Construction of water transmission pipelines would result in temporary disturbance of approximately 395 acres of habitat for the Fish Springs Ranch Project and 241 acres for Intermountain Water Supply Project. Depending on success of reclamation, habitat disturbed by pipeline construction would have reduced capacity to support existing wildlife populations for 3 to 5 years or longer. Species dependent on sagebrush habitat could experience reduced habitat quality if sagebrush does not re-establish on reclaimed pipeline rights-of-way and other areas. Breeding and foraging habitat for sage grouse, a sensitive species, would be reduced as a result of the Projects; however, this loss would not likely affect regional populations and distribution of sage grouse once successful reclamation has been achieved. No known historic leks would be affected.

The threatened bald eagle would not likely be affected by the proposed Projects through reduction or loss of short-term foraging opportunities in upland habitats and long-term effects due to possible reductions in wetland habitat. This change in wetland habitat, if any, would be a result of lowered groundwater levels and/or reduced flow from springs and flowing wells resulting from proposed production well pumping. The Fish Springs Ranch proposed pumping could reduce natural groundwater flow to Pyramid Lake from Smoke Creek Desert and eastern Honey Lake Valley (via Astor and Sand Passes). The estimated potential reduction is equivalent to 0.04 percent of average annual flow into Pyramid Lake from the Truckee River. Potential reduction in groundwater recharge to Pyramid Lake would not affect Lahontan cutthroat trout and cui-ui. No effects have been identified on surface flow to Pyramid Lake in the Truckee River, which is the major component of source water to the lake.

The endangered Carson wandering skipper would not be directly affected by habitat removal from pipeline construction activity and permanent facilities (no loss of habitat would occur). Reduction in flow from springs or flowing wells resulting from groundwater withdrawal may affect the Carson wandering skipper through loss of habitat.

ACCESS AND LAND USE

Access

Implementation of the Proposed Actions would have short-term impacts to access routes in areas encompassed by the North Valleys Area Plan ranging from minor traffic delays to increased traffic associated with transporting materials, equipment, and personnel to construction sites.

Land Use

The Proposed Actions would result in approximately 636 acres of surface disturbance of which 367 acres would occur on public land (225 Fish Springs Ranch/142 acres Intermountain Water Supply). Fish

Springs Ranch Project would disturb approximately170 acres of private land and Intermountain Water Supply Project 99 acres of private land. While land ownership would remain unchanged, grazing and public use of the areas may experience short-term disruption during construction. Following reclamation, disturbed areas would be returned to previous uses. Grazing allotments or stocking rates would not be affected by the Proposed Actions.

RECREATION

Under the Proposed Actions, recreational users of public land in encompassed by the North Valleys Area Plan would potentially be required to find other locations for specific activities and events or event staging areas if such activities conflict with construction operations.

NOISE

Major sources of noise associated with the Proposed Actions would be from construction related equipment and is predicted to be less than the maximum allowed by Washoe County Code. Noise generated by increased truck traffic transporting materials and equipment would increase along access routes to the Projects Area, but would be of short duration. Construction noise levels would be short-term, brief, and intermittent. Long-term noise levels associated with the wellheads, pump station, and pipeline operations would generally be steady and continuous, and predicted to be at lower levels than construction noise.

VISUAL RESOURCES

Color and texture of reclaimed areas would result in minimal contrast to the existing landscape. Disturbed soil associated with pipeline construction is not expected to contrast with the undisturbed soil color. Reclamation activities would include shaping edges of disturbance areas to blend in with surrounding land forms and undisturbed vegetation. VRM objectives for public land would be met by the proposed reclamation. New structures associated with pump stations and storage tanks would introduce moderate visual impacts of geometric shapes into a landscape of rolling hills.

SOCIAL AND ECONOMIC RESOURCES

The Proposed Actions would affect social and economic resources by increasing the level of economic activity in Washoe County during construction of the Projects. These effects are expected to be beneficial because the Proposed Actions would increase spending and income levels in the area by providing jobs. The Proposed Actions would deliver water to the Stead/Lemmon Valley Area, thereby allowing development of approved land uses which have not been allowed to develop because of the lack of a municipal water supply.

CULTURAL RESOURCES

Two National Register eligible properties are present in areas common to the Proposed Actions. Both properties were treated during the Tuscarora Pipeline Project and no further action would be required at these properties in advance of either Proposed Action. Previously unevaluated sites are not present in the area of potential effect (APE) common to both Proposed Actions.

Seven National Register eligible properties are located within the APE unique to the Fish Springs Ranch Proposed Action. These sites have been recommended as eligible based on Criterion D. Treatment on four of the sites was limited to selected features or loci within the immediate Tuscarora Project right-of-way. Additional data recovery may be required at these properties in advance of the Fish Springs Ranch Proposed Action.

Six sites located within portions of the APE unique to the Fish Springs Ranch Proposed Action remain unevaluated or contain an unevaluated component. These sites would require additional review to determine eligibility for the National Register.

Two National Register eligible properties (based on Criterion D) are located within the APE unique to the Intermountain Water Supply Proposed Action. Four sites located within portions of the APE unique to the Intermountain Water Supply Proposed Action remain unevaluated or contain an unevaluated component. These sites would require additional review to determine eligibility for the National Register prior to construction activities.

NATIVE AMERICAN RELIGIOUS CONCERNS/INDIAN TRUST RESPONSIBILITIES

No concerns regarding Native American traditional or religious uses of areas within the Fish Springs Ranch and Intermountain Water Supply Proposed Actions have been identified at this time. Based on preliminary findings, the Proposed Actions would not appear to have a direct or indirect impact on traditional or religious values located within the common areas, areas unique to the respective Proposed Actions, tribal trust resources, trust assets, or tribal health and safety. The ongoing consultation process may result in identification of Native American Religious Concerns/Indian Trust Responsibilities, which will be reviewed and considered during preparation of the RODs.

ENVIRONMENTAL JUSTICE

Potential impacts associated with the Proposed Actions would not have a disproportionate effect on minority populations. Two low-income populations have been identified in or near the Projects Area; neither would receive a disproportionate impact from implementation of the Proposed Actions.

ALTERNATIVES

ALTERNATIVE A - CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

Alternative A would provide a common 100-foot-wide construction right-of-way from the point of intersection of the Intermountain Water Supply pipeline and Fish Springs Ranch pipeline in Dry Valley to a point in Antelope Valley where each pipeline diverges to the respective terminus sites. Within the east-central portion of Bedell Flat, the pipelines also diverge and would not share a common right-of-way. Total linear distance shared by the proposed Intermountain Water Supply pipeline corridor and Fish Springs Ranch corridor is about 13 miles (2 miles in Dry Valley, 6 miles in Bedell Flat, and 5 miles in Antelope Valley).

A common permanent 60-foot-wide right-of-way with single access road would be issued to the respective proponents (i.e., each pipeline would be located within a common 60-foot wide right-of-way). Use of a common right-of-way would reduce surface disturbance by about 28 acres.

NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Actions would not be approved. Fish Springs Ranch and Intermountain Water Supply would not be authorized to develop rights-of-ways across public land. Potential impacts predicted to result from development of the Projects would not be realized. The No Action Alternative, however, would not preclude Fish Springs Ranch and/or Intermountain Water Supply from pumping groundwater for beneficial use as approved by the State Engineer in the basins (Honey Lake Valley, Dry Valley, and Bedell Flat) based on the proponent's water rights.

AGENCY PREFERRED ALTERNATIVE

The Agency Preferred Alternative is Alternative A – Construct Pipelines within Common Right-of-Way.

CHAPTER 1
INTRODUCTION

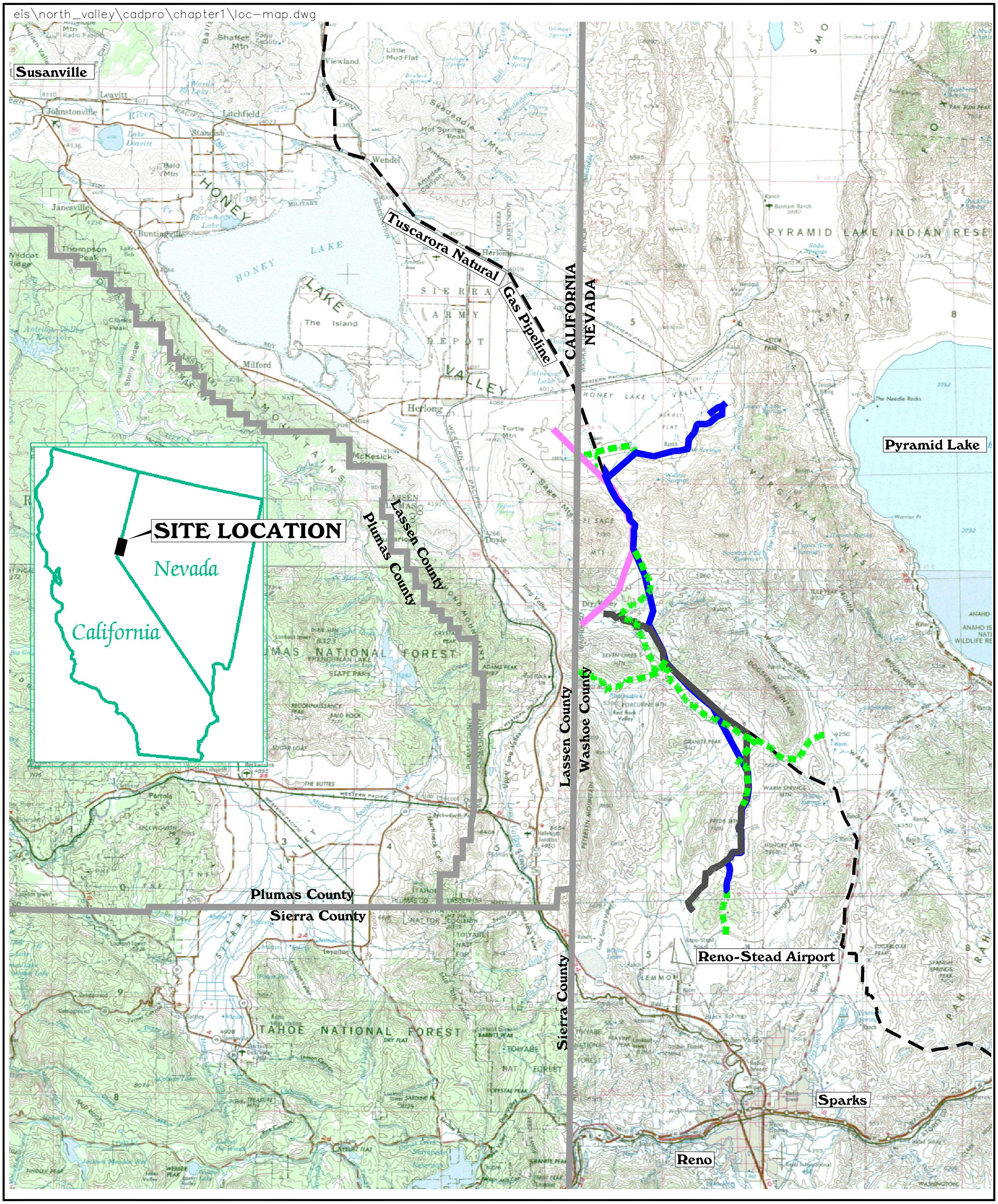
The United States Department of the Interior (USDI) Bureau of Land Management (BLM) Carson City Field Office received separate rights-of-way applications from Fish Springs Ranch, LLC and Intermountain Water Supply LTD to construct and operate water transmission pipelines across public land administered by BLM (Proposed Actions or Projects). Fish Springs Ranch and Intermountain Water Supply are two independent companies proposing projects in Washoe County, Nevada generally located approximately 15 to 35 miles north of Reno, Nevada (**Figure 1-1).**

Each company is proposing to construct and operate water supply and transmission projects to meet present and future water demands identified in the Washoe County Comprehensive Plan – North Valleys Area Plan; specifically, the Proposed Actions would result in delivery of water to the Stead/Lemmon Valley Area. The Washoe County Comprehensive Plan generally excludes areas that lie within incorporated cities; however, the Stead/Lemmon Valley Area includes land within the City of Reno. Operation, maintenance, and termination of the proposed facilities may ultimately become the responsibility of the water purveyor (Washoe County Department of Water Resources or Truckee Meadows Water Authority) after Project construction is completed and system certified.

The Proposed Actions consist of installation and operation of wellheads, electrical transmission lines, water transmission pipelines, pump stations, and surge tanks. In addition, Fish Springs Ranch's Proposed Project would involve construction of an electrical substation on private land adjacent to the Alturas 345 kilovolt (kV) distribution line and a terminal storage tank on public land. Intermountain Water Supply's Proposed Project includes installation of wells, construction of a pump station and storage tanks on public land, and construction of buried powerline service to the Dry Valley wells and above-ground powerlines to the booster station and production wells in Bedell Flat.

The Fish Springs Ranch proposal would convey a maximum of 8,000 acre-feet per year (af/yr) from six wells located on Fish Springs Ranch property. The proposed water transmission pipeline would proceed south approximately 28 miles from the pump station to the terminal tank site between Lemmon Valley and Antelope Valley. The Intermountain Water Supply proposal would convey up to 2,500 af/yr from seven wells (five wells in Dry Valley totaling 2,000 af/yr, and two wells in Bedell Flat totaling 500 af/yr). The proposed Intermountain Water Supply pipeline would parallel the Fish Springs Ranch pipeline in Bedell Flat and proceed south approximately 24 miles to a terminus near the Stead/Lemmon Valley Area.

Portions of the respective Projects would be located in whole or in part on public land administered by BLM; such operations must comply with BLM regulations for activities on public land, Title 43, Code of Federal Regulations, Part 2800, Rights-of-Way Program, and the Federal Land Policy and Management Act of 1976. Due to potential for the proposed Projects to result in significant environmental impacts, BLM determined that an Environmental Impact Statement (EIS) would be necessary, as required by the



Base Map From Sure!MAPS Raster California and Nevada 1:100,000

Proposed Intermountain Water Supply Waterline
Proposed Fish Springs Ranch Waterline
Proposed Access Routes
Tuscarora Natural Gas Pipeline
Alturas Powerline

Projects Location Map
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 1-1

National Environmental Policy Act of 1969 (NEPA). Because both proposed rights-of-way projects have similar timing, geography, and type of actions, BLM has determined that the two proposals would be analyzed in one EIS. This document follows regulations promulgated by the Council on Environmental Quality (CEQ) for implementing procedural provisions of NEPA (40 CFR 1500-1508) and BLM's NEPA Handbook (H-1790-1).

BLM is the lead agency in preparing this EIS for the proposed operations, with the following cooperating agencies:

- U.S. Fish and Wildlife Service
- U.S. Bureau of Indian Affairs
- U.S. Geological Survey
- Sierra Army Depot
- Susanville Indian Ranchera
- California Department of Water Resources
- California Department of Fish and Game
- Lassen County, California
- Washoe County, Nevada
- Truckee Meadows Water Authority
- Truckee Meadows Regional Planning Agency
- Airport Authority of Washoe County
- City of Reno
- City of Sparks
- Pyramid Lake Paiute Tribe

This Final EIS supersedes and replaces the Draft EIS prepared by BLM in May 2005 for the Proposed Projects. This EIS describes components of, reasonable alternatives to, and potential impacts to environmental resources from proposed construction and operation of water transmission pipelines and associated components. Chapter 1 describes the purpose of and need for the Proposed Actions, role of BLM, and public participation in the EIS process. Chapter 2 provides a historical perspective of water projects in the North Valleys Planning Area, description of the Proposed Actions, and alternatives to the Proposed Actions. Chapter 3 describes the existing environment in the Projects Area.

Chapter 4 of this Final EIS details potential direct, indirect, and cumulative effects associated with the Proposed Actions and Alternatives, and possible mitigation measures that may be selected to reduce or eliminate impacts associated with construction of the water transmission pipelines and associated facilities. Chapter 5 identifies consultation and coordination with state and federal agencies that occurred during preparation of this EIS, and a list of preparers. Chapter 6 contains a list of references cited in developing the EIS. Chapter 7 is a compilation of comments BLM received on the Draft EIS, along with BLM's responses to substantive comments.

The following appendices are included at the end of this Final EIS:

Appendix A: Spring Inventory
Appendix B: Riparian Survey in Proposed Pipeline Corridors
Appendix C: Groundwater Model Summaries and Evaluation
Appendix D: Recommended Water Resources Monitoring and Management Plan
Appendix E: June 2005 Groundwater Quality Data for Fish Springs Ranch Wells
Appendix F: Pumping History and Groundwater Levels for Fish Springs Ranch Wells

PURPOSE OF AND NEED FOR ACTIONS

The purpose of the two proposed Projects is to install water transmission pipelines and associated pipeline components. Installation of the water pipelines across public land administered by BLM would allow Fish Springs Ranch and Intermountain Water Supply to convey groundwater from sources for which they control water rights to terminuses located in the Stead/Lemmon Valley Area. The need for the Proposed Actions is to provide water to meet current and future domestic and industrial demand in the Stead/Lemmon Valley Area in accordance with the master plans of Washoe County and the City of Reno, which are in conformance with the Truckee Meadows Regional Plan.

AUTHORIZING ACTIONS

Application for rights-of-way across public land submitted to BLM may be approved only after an environmental analysis is completed. BLM decision options include approving the Projects as submitted, approving alternatives to the Projects to mitigate environmental impacts, approving the Projects with stipulations to mitigate environmental impacts, or denying the Projects. If BLM approves the Projects, only those activities on public land detailed in the Projects would be authorized to occur. If BLM denies the Project(s), the applicant can modify and resubmit the Plan of Development to address decisions made by BLM on the original Project(s) regarding unnecessary or undue degradation of federal land and provide for reasonable reclamation.

This EIS document evaluates potential impacts to resources on public land resulting from construction and operation of two water transmission pipelines to convey 8,000 af/yr from the Fish Springs Ranch Project and 2,500 af/yr from the Intermountain Water Supply Project to terminal pipeline areas located in the Stead/Lemmon Valley Area. Mitigation and monitoring measures developed by BLM and cooperating agencies during the EIS process to address potential impacts of the Projects on groundwater and surface water features would be submitted to the Nevada State Engineer and Washoe County for consideration in those agencies' required monitoring plans.

The Endangered Species Act (ESA) was amended in 1982 to allow the taking of listed species incidentally to an otherwise lawful activity by non-federal entities (Federal Register Vol. 64, No. 45, 1999). Non-federal property owners, such as private landowners, corporations, or state or local governments, wishing to conduct activities on their land that might result in the incidental take of a listed species must first obtain an incidental take permit from the U.S. Fish and Wildlife Service (Section 10(a)(1)(B)). To obtain a permit, the applicant must develop a Habitat Conservation Plan (HCP), designed to offset any harmful effects the proposed activity might have on the species. "Incidental Take" is defined in the Endangered Species Act as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species. Harm may include significant habitat modification where it actually kills or injures a listed species through impairment of essential behavior (e.g., nesting or reproduction).

Other federal, state, and local agencies have jurisdiction (including inspection responsibilities) over certain aspects of the Proposed Actions. **Table 1-1** is a comprehensive listing of the agencies and their respective permit/authorizing responsibilities.

TABLE 1-1
Regulatory Responsibilities

Authorizing Action	Regulatory Agency
National Environmental Policy Act	BLM
Plan of Development and Rights-of-Way National Historic Preservation Act	BLM BLM; Nevada State Historic Preservation Office (SHPO)
Native American Graves Protection & Repatriation Act	BLM
Indian Trust Responsibilities	BLM
American Indian Religious Freedom Act	BLM
Endangered Species Act of 1973	U.S. Fish & Wildlife Service (USFWS)
Water Appropriation Permits; Water Importation; Water Monitoring and Mitigation;	Nevada State Engineer – Nevada Division of Water Resources
Public Water Supply	Washoe County Health Department; Washoe County Department of Water Resources; Truckee Meadows Water Authority
Septic System Permits	Washoe County Health Department
Waste Water Discharge	City of Reno Public Works; Washoe County Department of Water Resources
Stormwater Discharge Permits	Nevada Division of Environmental Protection
Review Project of Regional Significance for conformance with Regional Plan	Truckee Meadows Regional Planning Commission
Review Project for conformance with Regional Water Management Plan	Regional Water Planning Commission
Utilities Environmental Protection Act	Public Utility Commission of Nevada
Air Quality Permit	Washoe County District Health, Air Quality Management
Building Permits	Washoe County Planning Department
Section 404 of the Clean Water Act	U.S. Army Corps of Engineers
Special Use Permit	City of Reno; Washoe County Planning Commission as applicable

RELATIONSHIP TO BLM AND NON-BLM POLICIES, PLANS, AND PROGRAMS

BLM policies, plans, and programs for rights-of-way in the Field Office are outlined in the Carson City Consolidated Resource Management Plan (CRMP) (BLM 2001a). The CRMP does not restrict rights-of-way for underground pipelines to designated corridors. BLM requires rights-of-way contain terms and conditions to minimize damage to scenic and aesthetic values, protect fish and wildlife habitat, protect the environment, and assure compliance with applicable air and water quality standards.

WATER RIGHTS

Water rights, pumping rates, volumes of water proposed for transfer annually to the Stead/Lemmon Valley Area, and points of water use proposed for transport across public land are outside the jurisdiction of BLM. Water rights and pumping rates are under purview of the Nevada State Engineer. The State Engineer has addressed issues surrounding groundwater withdrawal from Honey Lake Valley, Dry Valley, and Bedell Flat during hearings associated with applications for the respective water rights. Development of the Stead/Lemmon Valley Area associated with importation of water has been addressed by local planning agencies in accordance with Nevada statutes. Facilities, services, and land use plans have been previously approved under local government master plans, which must conform to the Truckee Meadows Regional Plan.

Fish Springs Ranch has groundwater rights in the amount of 14,108 af/yr that originated from irrigation permits issued in the Honey Lake Valley groundwater basin. The State Engineer issued a ruling on applications to change Fish Springs Ranch water rights allowing transfer of a portion of existing agricultural use water rights to municipal use in the North Valleys with the following conditions:

- Total combined duty shall be limited to 13,000 af/yr; of this total, 8,000 af/yr are included in the Fish Springs Ranch Proposed Action;
- Monitoring plan shall be submitted to the Nevada State Engineer for approval and used to evaluate impacts resulting from development of groundwater;
- Totalizing meters must be installed to record pumped water volumes; and
- Water quality standards shall not be violated.

Intermountain Water Supply has secured water use and inter-basin transfer rights for 3,000 af/yr in Dry Valley. Of this total, Intermountain Water Supply is proposing to pump 2,000 af/yr in its Proposed Action for Dry Valley. Intermountain Water Supply's Proposed Action for Bedell Flat is to pump 500 af/yr. To date, the Nevada State Engineer has approved a water right totaling 144 af/yr for Intermountain Water Supply in Bedell Flat. An appeal and new water rights application submitted by Intermountain Water Supply are pending with the Nevada State Engineer for the remaining 356 af/yr.

REGIONAL PLANNING

The Truckee Meadows Regional Planning Agency (TMRPA) was organized in 1989 under Nevada Revised Statute (NRS) 278.026 – 278.029 to develop and maintain a comprehensive Regional Plan for the jurisdictions of Reno, Sparks, and Washoe County. The Regional Plan is a cooperative effort of local and regional units of government, major service providers, and the citizens of Truckee Meadows. The Regional Plan is structured around planning principles to provide direction and standards for:

- How and where development occurs;
- Management of natural resources;
- Coordination of public facilities and services; and
- Implementation framework for the plan.

The Plan represents a regional consensus reached through a process of public dialog and decision-making to provide a unifying framework for local and regional policies and services. Units of local government maintain separate Master Plans, in conformance with the Regional Plan (NRS 278.0282).

The Regional Water Management Plan (RWMP; 2004-05), developed by the Regional Water Planning Commission (RWPC), contains a key policy (Policy 1.3.d) whereby land use or zoning designations do not guarantee allocation of future water resources. This applies to surface water and groundwater, including water for domestic wells. While a potential water supply deficiency may exist based on approved land uses, water supply commitments may only be approved in accordance with Policy 1.3.e of the RWMP (2004-05). The RWPC recognizes that proposed projects, master plan, zoning or land use changes may create a situation where there are insufficient water resources identified to supply the build-out of all approved land uses within the Truckee Meadows Service Area (Washoe County RWPC 2005).

The RWPC has determined that master plans of Reno, Sparks, and Washoe County conform with the Regional Plan, with certain exceptions (Ziegler 2005). To develop land in the Stead/Lemmon Valley Area, the proponent must provide adequate water rights and a physical water supply. This may or may not involve purchase or water rights, conversion of water rights, or importation into the area.

The Nevada State Engineer has designated all groundwater basins in the vicinity of Truckee Meadows as being in need of additional administration. According to the RWMP, municipal and domestic pumping in the Lemmon Valley hydrographic basin is nearing the estimated perennial yield and a long-term strategy to maintain the sustainability of groundwater resources is needed. In order to serve existing undeveloped approved land uses or future land use changes in Lemmon Valley, additional water resources must be imported to the basin (Washoe County RWPC 1997).

In September 2003, the Board of County Commissioners of Washoe County, Nevada adopted the amended North Valleys Area Plan, as a part of the Washoe County Comprehensive Plan. The North Valleys Area Plan serves as a guide for the Board of County Commissioners, Washoe County Planning Commission, and the community on matters of growth and development within the land included in the North Valleys Area Plan. Population is projected to grow at an annual rate of 1.0 percent in the North Valleys Area Plan (Washoe County Department of Community Development 2003). As growth continues to occur, demand for public services and facilities will increase.

Because all groundwater within the basins included in the North Valleys Area Plan has been appropriated, Washoe County has imposed a policy that requires adequate water rights as a condition of approval of any subdivision in the Planning Area. The Planning Area covers approximately 245 square miles, excluding the City of Reno in the Stead area. Implementation of the Proposed Actions would accommodate projected population growth and development in the Stead/Lemmon Valley Area for an undetermined time period.

The Washoe County Comprehensive Plan generally excludes areas within incorporated cities. Since the North Valleys Area Plan is within the Comprehensive Plan, it likewise generally excludes incorporated cities. However, the area in which the water would be used as described in the Proposed Actions does include a portion of the City of Reno that lies in the Stead/Lemmon Valley area.

Public services, facilities policies, and action programs specific to the North Valleys Area Plan are identified in the Comprehensive Plan – North Valleys Area Plan (Washoe County Department of Community Development 2003). North Valleys land use plans identify over 150,000 acres of rural and suburban land for residential, commercial, and industrial development with specific density criteria. Approximately 78,000 acres (of the total) would be available for open space, public parks, and recreation facilities.

Area and specific plans for Cultural and Scenic Resources (archaeological resources, historic places, and scenic areas), Land Resources (soil, vegetation, wildlife, farmland, geologic, and fire hazards), Water Resources (wetlands and flood hazards), Land Use and Transportation (residential, commercial, industrial, parks and recreation, roads, and railroads) and Public Services and Facilities (water systems, wastewater treatment facilities, fire protection, police, libraries, and schools) also have been developed as part of the Washoe County Comprehensive Plan to address projected growth in the area.

PUBLIC SCOPING

To allow for an early and open process for determining the scope and significance of issues related to the Proposed Action (40 CFR 1510.7), a public scoping period was provided by BLM. A Notice of Intent to prepare the EIS was published in the Federal Register on September 15, 2003 (NV-030-5700-ER; N-76800, N-76897, Volume 68, Number 178, page 54000-54001). Publication of this notice in the Federal Register initiated a 30-day public scoping period for the Proposed Actions that provided for acceptance of comments through January 31, 2004.

BLM held open house and public presentations on eight occasions between October 2, 2003 and January 7, 2004. Scoping comments were received from seventeen individuals and organizations. Concurrent with these actions, BLM issued a news release to local media organizations with coverage in the surrounding geographical regions.

Public and agency comments concerning the Proposed Actions are grouped according to general subject area and are summarized in **Table 1-2**. Comments received during the scoping period are included in **Table 1-2** regardless of applicability or relevance to the Proposed Projects or the EIS process. This table also includes references to sections of the Final EIS, which provide information on issues raised in the comments.

TABLE 1-2
Scoping Summary – North Valleys Water Projects

Issues	Final EIS Section
Proposed Action	
Include Cold Springs Valley in the EIS as it was mentioned in the Vidler Company's North Valleys Water Supply project report.	Chapter 2 – Proposed Action and Alternatives
Scope of project should not include distribution of water once it reaches terminal water storage tanks in Lemmon Valley.	Chapter 1 - Introduction
What is the minimum size pipe necessary to transport 8,000 acre-feet of water?	Chapter 2 – Proposed Action and Alternatives
Describe the amount of water a 32-inch diameter pipe can transport over a year.	Chapter 2 – Proposed Action and Alternatives
Identify retail purveyor of water after it reaches Lemmon Valley.	Chapter 2 – Proposed Action and Alternatives
Describe protocols that would be established to analyze and maintain operational performance standards and any contingencies should specific measures fail to meet performance criteria.	Chapter 2 – Proposed Action and Alternatives
Alternatives and Monitoring/Mitigation Measures	
All possible water pipeline corridors throughout the project area should be addressed.	Chapter 2 – Proposed Action and Alternatives
Other potential sources of water for North Valley area should be identified and assessed.	Beyond scope of this document.
Water conservation in North Valley area should be addressed.	Beyond scope of this document.
Monitoring of groundwater drawdown, effects on impacted aquatic systems, and loss of habitat and aquatic wildlife should be monitored to assist in implementation of mitigation measures.	Chapter 4 – Water Resources
Describe implementation of mitigation measures that include: revegetation of pipeline corridors with plant species native to the ecoregion, and monitoring of reclamation efforts (including vegetation, aquatic and terrestrial resources).	Chapter 2 – Proposed Action and Alternatives
Describe which agencies would have authority and responsibility to determine safe yield amount of groundwater extraction and exportation and which agencies would be responsible for enforcing mitigation or program performance measures.	Chapter 1 - Introduction
Describe mitigation monitoring and reporting program to ensure compliance and what action would be taken should extraction rate result in significant impacts.	Chapter 4 – Water Resources

TABLE 1-2 (continued) Scoping Summary – North Valleys Water Projects	
Issues	**Final EIS Section**
Would impact threshold criteria be established to identify groundwater levels that will trigger protective enforcement action?	Chapter 4 – Water Resources; Appendix D
Evaluate use of imported groundwater in rural residential areas closer to the source(s) as an alternative.	Chapter 1 - Introduction
Evaluate alternate pipeline route along Matterhorn Road to a terminal tank located east of proposed location.	Chapter 2 – Proposed Action and Alternatives
Existing Environment	
EIS should describe existing environment in the project area.	Chapter 3 – Affected Environment
Assess the extent to which current irrigation operations at Fish Springs Ranch would continue.	Chapter 2 – Proposed Action and Alternatives
Describe existing contamination of groundwater at Sierra Army Depot.	Chapter 3 – Water Resources
When did Fish Springs dry up?	Chapter 3 – Water Resources
Describe existing sources of water currently used in North Valley area.	Chapter 2 – Proposed Action and Alternatives
Describe groundwater flow to Pyramid Lake+	Chapter 3 – Water Resources
Describe surface and groundwater flow history, vegetation, dependent fish and wildlife species, flora and fauna, and populations including interstate mule deer and antelope herds and California big horn sheep and corresponding impact on related recreation (i.e. deer and chukar hunting opportunities).	Chapters 3 & 4 – Water Resources; Vegetation Resources; Wildlife Resources
What is the quality of groundwater to be transported, especially total dissolved solids	Chapter 3 – Water Resources
Water Resources	
EIS should address the direct, indirect, and cumulative effects of groundwater withdrawal on springs, seeps, wells, and surface water in the study area.	Chapter 4 – Water Resources
Fully explain the potential for impacts to surface or groundwater quality from the proposed project including those from the Sierra Army Depot, Herlong Prison Facility, municipal and industrial practices in the North Valleys, and wastewater treatment and disposal resulting from the North Valleys project.	Chapter 4 – Water Resources
Evaluate the environmental impacts of increasing total dissolved solids in the Truckee River and Pyramid Lake through effluent treatment or seepage.	Chapter 1 – Introduction
A hydrologic model assessing the effects of pumping on groundwater levels, spring discharges, and surface water should be developed.	Chapter 4 – Water Resources
Identify and map all affected water bodies, including isolated springs and wetlands.	Chapter 3 – Water Resources
Groundwater drawdown zones and extent of drawdown at specific time intervals over the life of the project should be identified and displayed on maps in the EIS.	Chapters 3 & 4 – Water Resources
Describe potential direct, indirect, and cumulative effects of groundwater withdrawal on surface and groundwater sources that could affect Pyramid Lake and Pyramid Lake Paiute Tribe.	Chapter 4 – Water Resources
Describe additional wastewater treatment facilities necessary as a result of increased development	Chapter 1 – Introduction
Describe the difference between gross and net groundwater extraction, recognizing some net recharge in an agricultural operation occurs.	Chapter 3 & 4 – Water Resources
Evaluate the possibility of 8,000 acre-feet being exported to Reno (North Valleys) and remainder (5,000 AF) being applied to Fish Springs Ranch alfalfa fields for a total extraction of 13,000 AF.	Chapter 2 – Proposed Action and Alternatives

TABLE 1-2 (continued) Scoping Summary – North Valleys Water Projects	
Issues	**Final EIS Section**
Evaluate potential changes in area recharge from proposed extraction and export from Dry Valley.	Chapter 4 – Water Resources
Would monitoring wells be required to monitor effects of the project and develop information to help guide future management decisions?	Chapter 4 – Water Resources; Appendix D
Discuss replacement of Truckee River water with proposed project water and effects on Truckee River.	Chapter 1 – Introduction
Potential effects of groundwater pumping in Dry Valley on surface water and subsurface inflow to Honey Lake basin via Long Valley Creek should be addressed.	Chapter 4 – Water Resources
Could ongoing extraction cause the Sierra Army Depot contamination plume to migrate into a larger area, or cause poorer quality water from the central portion of the basin to enter the proposed well field?	Chapter 4 – Water Resources
Describe impacts of proposed project on stream flow of Long Valley Creek.	Chapter 4 – Water Resources
Describe quantity and quality of existing surface and groundwater sources in the study area.	Chapter 3 – Water Resources
Describe the cumulative effects of groundwater drawdown of all wells that would be in operation over the life of the projects.	Chapter 1 – Introduction Chapter 4 – Water Resources
Describe groundwater flow to Pyramid Lake.	Chapter 3 – Water Resources
Describe effects on groundwater recharge rates due to increase in impervious surfaces associated with new development resulting from proposed project.	Chapter 4 – Water Resources
Evaluate potential impacts to Amadee Hot Springs and associated wetlands from groundwater pumping.	Chapter 4 – Water Resources
Evaluate potential impacts from groundwater withdrawal on springs in Skedaddle and Peterson Mountains.	Chapter 4 – Water Resources
Evaluate potential impacts to municipal water supply systems at Sierra Army Depot and Herlong Utilities Cooperative.	Chapter 4 – Water Resources
Evaluate effects of groundwater withdrawal in Honey Lake Valley on groundwater remediation modeling being conducted at the Sierra Army Depot.	Chapter 4 – Water Resources
Describe effects to surface and groundwater resources from animal waste contamination of runoff, damage to riparian areas, and proposed mitigations resulting from conversion of irrigated agricultural production to non-irrigated cattle grazing.	Chapter 2 – Proposed Action and Alternatives Chapter 4 – Water Resources
Describe the effect of treated effluent discharge into Swan Lake, Whites Lake, Silver Lake and/or other existing playas in the Lemmon Valley hydrographic basin on base flood elevations associated with those water bodies.	Chapter 2 – Proposed Action and Alternatives Chapter 4 – Water Resources
The EIS should address whether approval by the State Engineer is necessary for interbasin transfer if treated effluent is to be piped out of Lemmon Valley hydrographic basin to Truckee Meadows hydrographic basin or other location.	Chapter 1 – Introduction
Describe the age and origination of well field groundwater that contributes to well field production.	Chapter 3 – Water Resources
Identify impacts of wastewater disposal in a closed hydrographic basin.	Chapter 3 – Water Resources
Identify positive benefits of the projects such as serving development of the growth corridor per the regional plan.	Chapter 1 – Introduction
What is the quality of groundwater to be transported, especially total dissolved solids.	Chapter 3 – Water Resources
Address whether water resources resulting from the proposed projects would be provided exclusively within Truckee Meadows Service Areas (TMSA) as defined in the Truckee Meadows Regional Plan (May 2, 2002, as amended).	Chapter 1 – Introduction

TABLE 1-2 (continued) Scoping Summary – North Valleys Water Projects	
Issues	**Final EIS Section**
Determine if Truckee River water now serving North Valleys will be brought back to the Truckee Meadows service area, and if so, how and where should it be allocated?	Chapter 1 – Introduction
Evaluate the potential direct, indirect, and cumulative effects of these projects, if any, on wetlands and associated resources in Warm Springs (Palomino) Valley to the southeast.	Chapter 1 – Introduction Chapter 4 – Water Resources
Discuss relationship and potential effects to Winter's Doctrine water held by Pyramid Lake Paiute Tribe.	Chapter 3 – Native American Religious Concerns
Describe potential effects of groundwater removal on existing wells in the eastern portion of Honey Lake Valley basin.	Chapter 4 – Water Resources
Describe the safe annual extraction levels in Dry Valley, Bedell Flat and Honey Lake Valley.	Chapter 1 – Introduction Chapter 4 – Water Resources
Water Rights	
Evaluate water rights associated with current and future needs.	Chapter 1 – Introduction Chapters 3 & 4 – Water Resources
Vegetation	
Evaluate any increased risk for establishment of invasive plant species, and disclose measures that would be taken to avoid such an impact.	Chapter 1 – Introduction Chapters 3 & 4 – Vegetation Resources, Access and Land Use
Describe effects of Project on high desert habitat.	Chapter 4 – Vegetation Resources
Disclose the potential for reducing native biological diversity, including the potential for increased risk of displacement of native habitats by cheatgrass.	Chapter 4 – Vegetation Resources
Evaluate the effects of groundwater removal on phreatophytic plant communities.	Chapter 4 – Vegetation Resources
Evaluate impacts to native and medicinal plants.	Chapter 4 – Vegetation Resources Chapters 3 & 4 – Cultural Resources
Effects of habitat fragmentation from pipeline corridor on sagebrush, bitterbrush, shadscale, and greasewood plant communities.	Chapter 4 – Vegetation Resources
Evaluate potential effects on vegetation resulting from groundwater withdrawal.	Chapter 4 – Vegetation Resources
Wildlife	
Evaluate the effects of groundwater removal on resting, feeding, and nesting habitat for migratory waterfowl and shorebirds	Chapter 4 – Wildlife Resources
Evaluate potential effects to Lahonton Cutthroat Trout and Cui-cu in Pyramid Lake from groundwater withdrawal	Chapter 4 – Wildlife Resources
Potential impact on biological components, including destruction or alteration of breeding, nesting, cover, migration, and foraging habitats, should be described.	Chapter 4 – Wildlife Resources (Special Status Species)
Consult U.S. Fish and Wildlife Service and Nevada Division of Wildlife regarding Project.	Chapter 1 – Introduction Chapter 4 – Wildlife Resources (Special Status Species) Chapter 5 – Consultation, Coordination, and Preparation
Describe indirect effects on wildlife habitat from increased development in North Valleys Planning Area as a result of increased availability of water	Chapter 4 – Wildlife Resources
Evaluate impacts to Doyle and Hallelujah Junction Wildlife areas from pumping groundwater.	Chapter 4 – Water Resources; Wildlife Resources
Evaluate the effect of vehicle mortality on wildlife (particularly deer) from projected development in the North Valleys Planning Area.	Chapter 1 – Introduction

TABLE 1-2 (continued)
Scoping Summary – North Valleys Water Projects

Issues	Final EIS Section
Assess potential effects to Honey Lake and Honey Lake Valley, Pyramid Lake and surrounding area, and affected springs and wetlands as resting, feeding, and nesting habitat for migratory waterfowl and shorebirds.	Chapter 4 – Water Resources; Wildlife Resources
Describe effects on wetlands and tundra swan wintering area (Swan Lake Nature Study Area) if additional levels of effluent are discharged into Swan Lake and whether it is covered under the Migratory Bird Treaty Act.	Chapter 1 – Introduction
Effects of discharge from wastewater treatment facilities on fish and wildlife resources.	Chapter 1 – Introduction
Raptor nest sites, sage grouse habitat, winter and summer range for deer and antelope, and corridors should be identified and evaluated.	Chapters 3 & 4 – Wildlife Resources; Vegetation Resources
Effects of groundwater removal on breeding, nesting, cover, and foraging habitat for wildlife	Chapter 4 – Wildlife Resources
Evaluate impacts to wildlife habitat.	Chapter 4 – Wildlife Resources
Land clearing activities should occur outside of the avian breeding season.	Chapter 2 – Proposed Action and Alternatives Chapters 3 & 4 – Wildlife Resources
Fisheries and Aquatic Resources	
Assess environmental impacts of increased total dissolved solids in the Truckee River and Pyramid Lake on listed fish species.	Chapter 1 –Introduction Chapter 4 – Wildlife Resources (Fisheries)
Evaluate the effects of groundwater removal on wetlands and riparian communities	Chapter 4 – Vegetation Resources
Effects of groundwater drawdown on fish, springsnails, and other aquatic organisms.	Chapter 4 – Wildlife Resources (Fisheries)
Potential effects on wetlands and associated resources in Warm Springs (Palomino) Valley	Chapter 4 – Vegetation Resources
Evaluate potential impacts to wetlands associated with Calneva and Duck lakes.	Chapter 4 – Vegetation Resources
Evaluate potential effects of groundwater drawdown on habitat for fish, springsnails, other aquatic organisms, and on other wildlife.	Chapter 4 – Wildlife Resources (Fisheries)
Soil	
Potential for erosion of exposed soil should be described.	Chapter 4 – Soil Resources
Evaluate potential for erosion of exposed soil and develop mitigation measures to avoid, or reduce this impact.	Chapter 2 – Proposed Action and Alternatives Chapter 4 – Soil Resources
Aesthetic (noise and visual)	
Assess visual impact of wells, pipeline, generator, and associated buildings.	Chapter 4 – Visual Resources
Evaluate noise associated with generators, pumps, pipeline, and building construction.	Chapter 3 & 4– Noise
Threatened, Endangered, and Candidate Species/Species of Concern	
Describe impacts on federally listed species and species of concern.	Chapter 4 – Vegetation Resources; Wildlife Resources (Special Status Species)
Evaluate potential effects on Lahontan Cutthroat Trout, Cui-ui, High Rock Spring Tui Chub, and Carson Wandering Skipper.	Chapter 4 – Wildlife Resources (Special Status Species)
Describe effect of groundwater withdrawal on rare and/or sensitive plant and animal species in the affected hydrographic basins.	Chapter 4 – Vegetation Resources; Wildlife Resources (Special Status Species)

TABLE 1-2 (continued) Scoping Summary – North Valleys Water Projects	
Issues	**Final EIS Section**
Identify federally listed species or species of concern which may occur in the area, be affected by the Project, or occur in the cumulative effects area.	Chapter 4 – Vegetation Resources; Wildlife Resources (Special Status Species); Cumulative Effects
A Biological Assessment should be developed to evaluate potential effects on listed species.	A Biological Assessment has been developed to evaluate potential effects on listed species; this was submitted to the USFWS
The cumulative effects area for analysis of threatened, endangered, and special status species should be described.	Chapter 4 – Vegetation Resources; Wildlife Resources (Special Status Species); Cumulative Effects
Describe effects of the Project on rare or threatened plant and wildlife species	Chapter 4 – Vegetation Resources; Wildlife Resources (Special Status Species)
Environmental Justice/Native American Concerns/Indian Trust Responsibilities	
Describe the potential effects of the Project on low-income and minority populations in Project area.	Chapters 3 & 4 – Cultural Resources; Native American Religious Concerns; Social and Economic Resources
Discuss the potential for any items found along the proposed pipeline right-of-way that would be treated as culturally significant under the National Historic Preservation Act (NHPA) and/or the Native American Graves Protection and Repatriation Act.	Chapter 4 – Cultural Resources
Air Quality	
Estimate emissions for proposed project including excavation, construction, operation, and support activities.	Chapter 4 – Air Resources
Describe impacts on human health from dust emissions.	Chapter 4 – Air Resources
Evaluate impacts of groundwater withdrawal and pipeline operation, and maintenance, on air quality and dust management measures.	Chapter 2 – Proposed Action and Alternatives Chapter 4 – Air Resources
Describe possible air quality impacts, particularly with respect to particulates, resulting from conversion of irrigated agricultural land to non-irrigated cattle grazing and mitigation measures.	Chapter 2 – Proposed Action and Alternatives Chapter 4 – Air Resources
Evaluate Class I airsheds near Project area.	Chapter 3 – Air Resources
Describe air quality impacts of increased traffic generated by development resulting from proposed projects and mitigation measures.	Chapter 1 – Introduction
Land Use and Grazing/Recreation	
Assess impacts to open space	Chapter 4 – Access and Land Use
Describe livestock grazing in the Project area and changes in current grazing practices and recreation use of the area.	Chapters 3 & 4 – Access and Land Use (Grazing Management); Recreation
Power Line	
Evaluate electrical requirements during construction and operation of the Project.	Chapter 2 – Proposed Action and Alternatives

TABLE 1-2 (continued) Scoping Summary – North Valleys Water Projects	
Issues	**Final EIS Section**
Transportation	
Evaluate potential effects of increased development due to availability of water on transportation and traffic in North Valleys Planning Area	Chapter 4 – Social and Economic Resources
Describe impacts on regional road network from traffic generated by development resulting from the proposed project and mitigation measures.	Chapter 4 – Social and Economic Resources
Socioeconomic	
Describe impacts to schools, public health and safety, taxes, and traffic from increased density of residential and business development in North Valleys Planning Area due to increased water supply.	Chapter 4 – Social and Economic Resources
Potential for increased development in North Valleys due to availability of water.	Chapter 1 – Introduction
Socioeconomic impacts including taxes, land values, demographics, and income should be described.	Chapters 3 & 4 – Social and Economic Resources
Evaluate potential effects of increased density of residential and business development in the North Valley areas (public health and safety, schools, taxes, traffic).	Chapter 4 – Social and Economic Resources
Provide projections in 5-year increments over the next 20 years of impacts on current regional plans for development and funding of community services.	Chapter 1 – Introduction
Describe indirect costs of the proposed project, particularly costs of public infrastructure improvements necessary to distribute potable water and treat wastewater generated by water importation.	Chapter 1 – Introduction
Describe whether treated effluent would remain within Lemmon Valley hydrographic basin or be disposed of elsewhere, disposal method, and associated costs.	Chapter 1 – Introduction
Determine costs and impacts to existing water and sewer rates.	Chapter 1 – Introduction
Describe increased hazard from wildland fires for new developments in the urban/wildland interface areas of Lemmon Valley and Cold Springs Valley, mitigation measures, and associated costs.	Chapter 1 – Introduction
Describe direct and indirect impacts to the operations of the Reno-Stead Airport from the proposed projects.	Chapter 1 – Introduction
The EIS should address the Truckee Meadow Regional Plan, which establishes priorities for regional development for provision of public facilities and services to support the desired development pattern. Areas outside of regional centers, transportation corridors, and other infill areas have the lowest priority.	Chapter 1 – Introduction
Reasonably Foreseeable Development	
Discuss the potential for increased development to occur in the North Valleys as a result of this project, and the indirect effects on fish and wildlife resources	Chapter 4 – Wildlife Resources
Identify growth and development projected for the area without the projects and determine level of growth projects could support.	Chapter 1 – Introduction
Describe direct and indirect effects of other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions, on the same resources that would be affected by the water development projects. Other past, present, and future development projects that should be considered include: those in the Truckee River watershed, land disturbing activities along pipeline routes, areas affected by groundwater drawdown, build-out in the Cold Springs Valley, and proposed groundwater supply projects at Newcomb Lake, Bedell Flat, and Warm Springs Valley.	Chapter 1 – Introduction Chapter 4 – Cumulative Effects

TABLE 1-2 (continued) Scoping Summary – North Valleys Water Projects	
Issues	**Final EIS Section**
Evaluate impacts on development or management actions that have yet to be built or enacted, but that have been approved for construction or enactment.	Chapter 4 – Cumulative Effects
Disclose future development at Reno Stead Airport and the acquisition of a portion of the water resources resulting from the proposed project(s).	Chapter 1 – Introduction
Evaluate potential development in adjacent areas of California resulting from increased development in North Valleys Planning Area of Nevada	Chapter 1 – Introduction
Evaluate cumulative effects of water importation and proposed power line development	Chapter 1 – Introduction Chapter 4 – Cumulative Effects
Disclose and discuss all speculative possible uses of water resources including new housing in the Stead/Silver Lake/Lemmon Valley areas, the Cold Springs area, fire protection, remediation of existing deficiencies, and increased flow in the Truckee River	Chapter 1 – Introduction

CHAPTER 2 DESCRIPTION OF PROPOSED ACTIONS AND ALTERNATIVES

INTRODUCTION

This chapter describes the Fish Springs Ranch and Intermountain Water Supply proposals to obtain rights-of-way across public land administered by BLM for construction of water transmission pipelines and associated components. The pipelines would convey groundwater at maximum rates up to 8,000 acre-feet per year (af/yr) for the Fish Springs Ranch Project and 2,500 af/yr for the Intermountain Water Supply Project to support projected growth in the Stead/Lemmon Valley Area north of Reno/Sparks, Nevada. Applications filed by Fish Springs Ranch and Intermountain Water Supply to obtain rights-of-way across public land are referred to as the North Valleys Rights-of-Way Projects (Proposed Actions) in this document.

Alternatives considered in this EIS are based on issues identified by BLM and cooperating agencies as well as comments received during the public scoping process. Alternatives are intended to reduce or minimize potential impacts associated with the Proposed Actions while still meeting the purpose and need of the Proposed Actions.

Detailed discussions of the following topics are presented in this chapter:

- History of water projects and rights-of-way applications in areas encompassed by the North Valleys Area Plan;
- Fish Springs Ranch and Intermountain Water Supply Proposed Actions; and
- Alternatives to Proposed Actions, including the No Action Alternative and Alternatives Considered but Eliminated from Detailed Analysis.

HISTORY

Senate Bill 367 passed by the Nevada State Legislature in 1989, created a regional planning process for southern Washoe County to help resolve regional growth issues. Under this statute (NRS 278.026 – 278.029), the Truckee Meadows Regional Planning Agency was formed to develop and maintain a comprehensive Regional Plan for the jurisdictions of Reno, Sparks, and Washoe County (Truckee Meadows Regional Planning Agency 1991). The Nevada State Legislature designated Washoe County as the regional water resource management agency with responsibility to plan and manage various water-related projects for the community.

The Washoe County Comprehensive Plan includes the North Valleys Area Plan. The North Valleys Area Plan is intended to act as a guide for the Board of County Commissioners, Washoe County Planning Commission, and the community on matters of growth and development in the North Valleys. Per Nevada Revised Statute 278.0282, the Regional Planning Commission found the master plans for Washoe County, City of Reno, and City of Sparks to be in conformance with the Truckee Meadows Regional Plan.

The North Valleys Area Plan encompasses Antelope Valley, Cold Springs Valley, Lemmon Valley, Red Rock Valley, and Bedell Flat hydrographic basins, which are designated as separate groundwater systems. The Plan guides growth by recognizing critical conservation areas, establishing existing and future land use and transportation patterns, and identifying current and future public services and facility needs.

To accommodate planned development of Lemmon Valley and Spanish Springs Valley in a manner consistent with goals of the Truckee Meadows Regional Plan, a reliable source of high-quality water to provide 250 gallons per day per capita is essential. In March 1991, the Nevada State Engineer approved Washoe County's plan to import 13,000 af/yr of groundwater from Honey Lake Valley approximately 40 miles north of Reno. The State Engineer's decision was appealed by Lassen County, California (which is located adjacent to Washoe County, Nevada), and the Pyramid Lake Paiute Tribe. The State Engineer's approval was reversed and remanded in 1992 by Second Judicial Court in Reno. In October 1992, the State Engineer issued a Supplemental Ruling that again approved inter-basin transfer of 13,000 af/yr. A motion to vacate that ruling was denied by the Second Judicial Court in February 1993. The case was subsequently appealed to the Nevada Supreme Court, which confirmed the Supplemental Rulings on Remand in June 1996.

In August 1989 and April 1992, Washoe County applied to BLM for two rights-of-way to cross public land for purposes of installing a water transmission pipeline (N-51606) that would connect water wells at Fish Springs Ranch in Honey Lake Valley through Bedell Flat to Lemmon Valley. The proposed water pipeline would extend approximately 38 miles. The second right-of-way application was for purposes of installing a 58-mile gas pipeline (N-55747) to power pumps that would transport the water. The gas pipeline would originate near Wadsworth, Nevada and terminate at Fish Springs Ranch.

Granting the rights-of-way would have allowed Washoe County to proceed with plans to construct the Truckee Meadows Project and supply future residents of Lemmon and Spanish Springs valleys with water from Honey Lake Valley through year 2015. The project was designed to serve a total population of 46,500. In response to overdraft of groundwater in Lemmon Valley basin (which resulted in a moratorium on development in Lemmon Valley), Washoe County adopted a policy that required adequate water rights as a condition of approval of any subdivision in the planning area.

A Draft EIS was prepared by BLM (1993) in response to Washoe County's rights-of-way application.

One of the primary issues and concerns addressed by that EIS was the potential impact of proposed groundwater withdrawal on existing water users in Honey Lake Valley. As a result, groundwater studies were implemented to provide data for analysis in the 1993 EIS.

As part of a groundwater study for the Honey Lake Valley area, a U.S. Geological Survey (USGS) model was used to simulate groundwater conditions in eastern Honey Lake Valley, including the Fish Springs Ranch area (Handman *et al.* 1990). For the 1993 Draft EIS analysis (BLM 1993), the USGS model was extended 3 miles westward to include the Sierra Army Depot at Herlong, California. The Sierra Army Depot considered results of the groundwater analysis to be flawed and suggested that project implementation would result in adverse impacts to on-going efforts to remediate groundwater contamination at the Depot. The project was also opposed by the Pyramid Lake Paiute Tribe due to conflicts with preliminary settlement of the Truckee River negotiations between the Tribe and Sierra Pacific Power Company, and the Tribe's claims to groundwater rights beneath the Smoke Creek Desert area at the north end of the Reservation. As a result of these issues, work on the EIS was suspended by the Secretary of the Interior in 1994 pending resolution of the following issues: 1) concurrence of USGS on regional groundwater modeling; 2) Sierra Army Depot groundwater contamination; and 3) concurrence from the Pyramid Lake Paiute Tribe on Trust Responsibility issues.

Although the Proposed Actions described in this EIS are similar to the 1993 Draft EIS project, proposed groundwater withdrawal rates have been revised by current Project proponent (Fish Springs Ranch) and groundwater modeling has been completed with USGS review. In addition, Sierra Army Depot has developed and implemented a groundwater control and treatment program to address contamination at that site. Trust Responsibility issues raised during the 1993 Draft EIS have been addressed as a result of reduced groundwater pumping rates included in Fish Springs Ranch's proposed Project.

In November 1996, the State Engineer informed Washoe County that action on the interbasin change application was necessary to maintain compliance with NRS 533.370(1)(c)(2). Washoe County responded with a request for an extension of time in order to consider all water supply options and alternatives for areas included in the North Valleys Area Plan. An Option/Acquisition Agreement between Washoe County and Northwest Nevada Water Resources, Ltd., (predecessor to Fish Springs Ranch, LLC), which would have transferred water rights to Washoe County has expired by its terms. Because of expiration of the Option, the underlying base rights of the water right permits remain with Fish Springs Ranch and will be the subject of importation of a portion of those rights (8,000 af/yr) into areas included in the North Valleys Area Plan as part of the Proposed Actions described in this EIS.

In 2002, the Washoe County Regional Water Planning Commission retained ECO:LOGIC Consulting Engineers to provide a detailed analysis of water supply alternatives to support projected growth estimates in the Stead, Lemmon Valley, and Cold Springs areas of Washoe County. Three scenarios were developed that would meet future water needs for the Stead/Lemmon Valley areas. Two of the scenarios were variations of the Vidler Water Company (Fish Springs Ranch) and Intermountain Water Supply projects addressed in this document; the third being replacement of Truckee Meadows Water

Authority's Stead main to accommodate increased water from the Truckee River. The study noted that integrating Truckee Meadows Water Authority and Washoe County water systems could effectively meet existing demands in the North Valleys Area Plan but would not provide sufficient amounts to meet projected build-out needs. The report concluded that development of the water importation projects would provide greater benefits at a lower cost to areas addressed by the North Valleys Area Plan compared with the Stead Main alternative (ECO:LOGIC 2002).

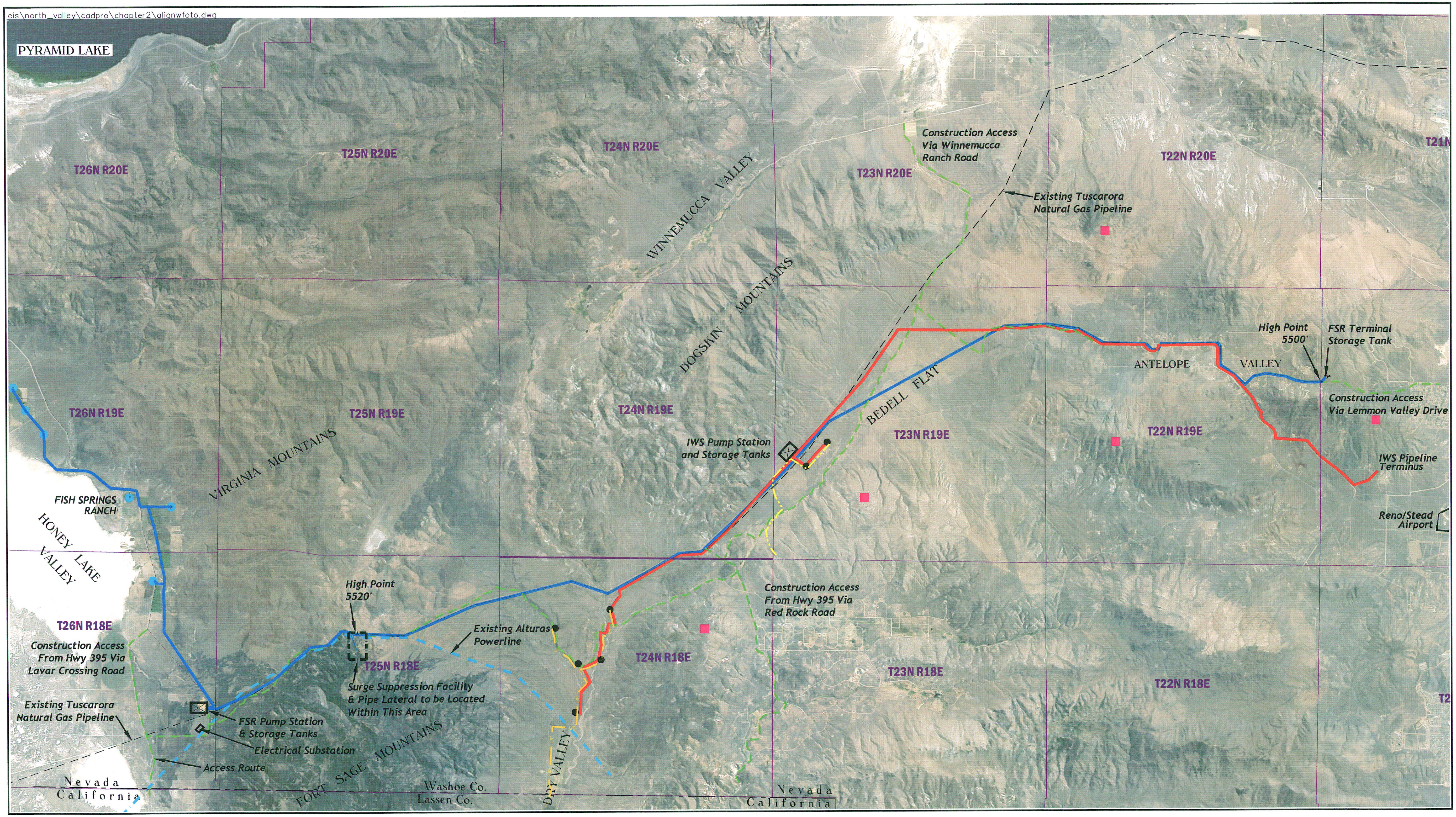
PROPOSED ACTIONS

The Proposed Actions are to install water pipelines and ancillary facilities on public and private land to convey groundwater from Honey Lake Valley, Dry Valley, and Bedell Flat hydrographic basins for municipal use in the Stead/Lemmon Valley areas. These areas are collectively referred to as the North Valleys Area Plan in this document. Implementation of the Proposed Actions would result in inter-basin transfer of up to a maximum of 8,000 af/yr of water from the Honey Lake Valley hydrographic basin and 2,500 af/yr from the Dry Valley/Bedell Flat hydrographic basins. Locations of proposed pipeline rights-of-way are shown on **Figure 2-1**.

The proposed Intermountain Water Supply corridor from the Dry Valley wells would intersect and parallel the Fish Springs Ranch corridor for about 13 miles (2 miles in Dry Valley, 6 miles in Bedell Flat, and 5 miles in Antelope Valley). Eight miles of this pipeline corridor shared by Fish Springs Ranch and Intermountain Water Supply would be located within, or adjacent to, the existing Tuscarora Gas Pipeline right-of-way.

FISH SPRINGS RANCH PROPOSED ACTION

Fish Springs Ranch is proposing construction of production wells, water collection and transmission pipelines, pump stations, water storage tanks, electrical substation, and distribution lines to convey up to a maximum of 8,000 af/yr of water to the Stead/Lemmon Valley Area. The water transmission pipeline would extend from six production wells in southeastern Honey Lake Valley southward through Dry Valley, Bedell Flat, Antelope Valley, to a terminal storage tank at the divide between Antelope Valley and Lemmon Valley.



0 Miles 2

LEGEND

IWS	INTERMOUNTAIN WATER SUPPLY
FSR	FISH SPRINGS RANCH

PROPOSED ACCESS ROUTES
TUSCARORA NATURAL GAS PIPELINE
ALTURAS POWERLINE
TOWNSHIP AND RANGE
PROPOSED IWS WATERLINE
PROPOSED FSR WATERLINE
PROPOSED UNDERGROUND ELECTRIC
PROPOSED ABOVEGROUND ELECTRIC
PROPOSED IWS WELL
PROPOSED FSR WELL
RADIO TELEMETRY SITE

Site Map
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 2-1

Production Wells

Water would be supplied from six new groundwater production wells constructed in accordance with current standards and designed for maximum efficiency with a combined pumping rate of 8,000 af/yr or 5,000 gallons per minute (gal/min). Buried 12- to 24-inch diameter water collection piping would connect individual wells to two 500,000-gallon capacity storage tanks located in the southwest portion of Fish Springs Ranch. Each well would be controlled via telemetry by water levels in the storage tanks. Production wells would be gravel packed, constructed with sanitary seals to a depth 100 feet below ground surface, and equipped with water lubricated vertical turbine pumps. All production wells would be located on property owned by Fish Springs Ranch (**Figure 2-1**).

Each wellhead would be enclosed in a masonry block structure meeting current Uniform Building Code construction standards and Truckee Meadow Water Authority and Washoe County minimum design requirements. Structures would be constructed on foundations slightly elevated above surrounding grade to minimize potential for facility flooding. Each structure would contain above ground piping, shutoff valve, check valve, flow meter, air release valve, electrical equipment, and telemetry. Structures would be located on private land and have a footprint approximately 15-feet wide by 20-feet long.

Pipelines

Well Field (Collection) Pipelines

Well field or collection pipelines would consist of a main collection pipe with waterlines extending to each well. A portion of the collection pipe would be located within the Fish Springs Road right-of-way. Pipe stubs outside the right-of-way would be located on Fish Springs Ranch property. The collection pipeline would cross public land between the groundwater supply wells and pump station. Approximately 10 miles of the main well field collection pipeline would be required.

Since line pressures associated with the proposed design are less than 150 pounds per square inch (psi), well field pipelines would likely be constructed of AWWA C900 and C905 polyvinyl chloride (PVC) pressure pipe, but other materials may be considered during final design. Sizes would vary from 12 to 24 inches in diameter with the larger diameters located closest to pump station storage tanks. Water pipe would be located underground. Appurtenant components include gate valves with valve boxes and small (3 x 2 feet) traffic-rated concrete vaults containing air release valves and blow-off valves at strategic locations.

Transmission Pipeline

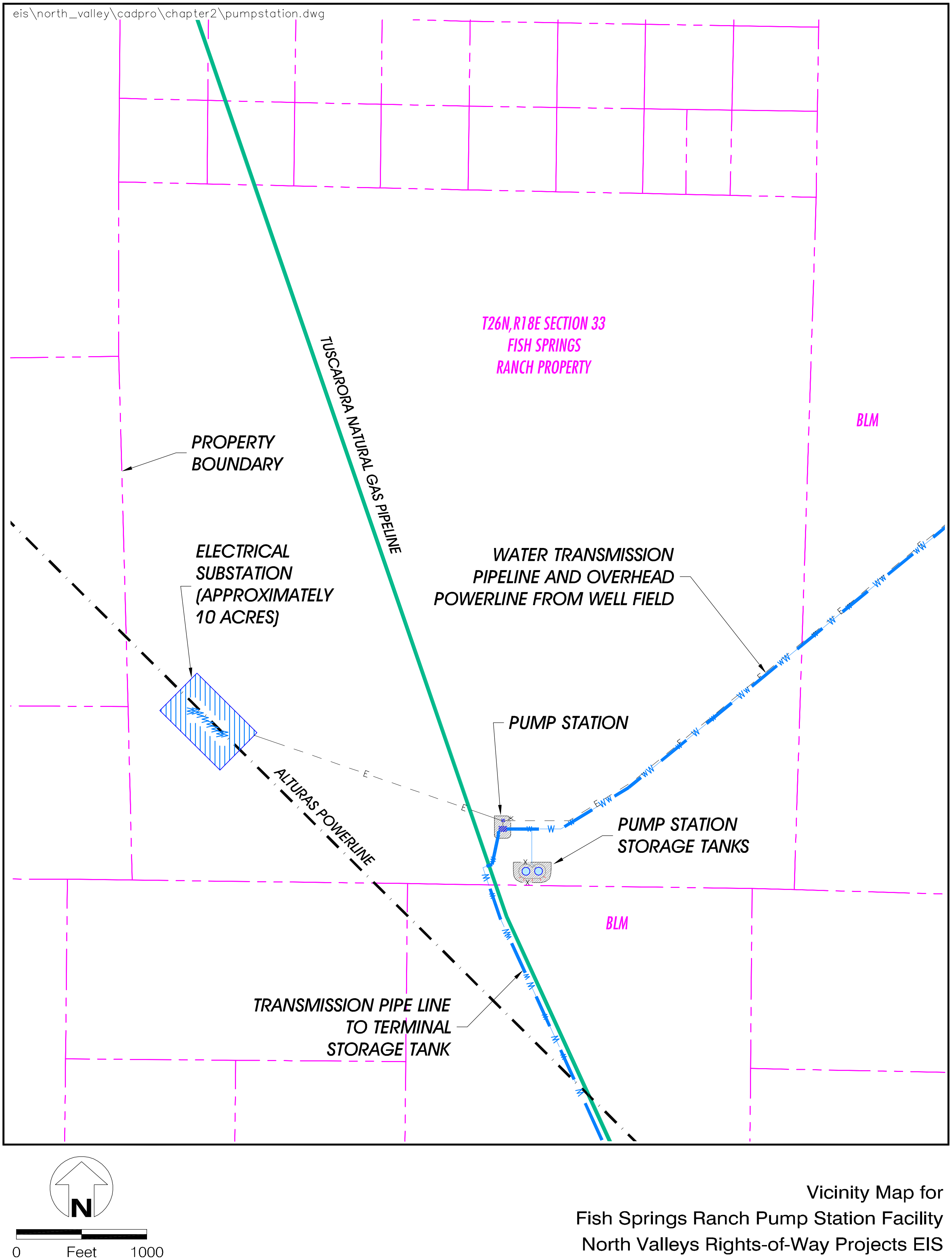
Water would be pumped from the storage tanks in southeastern Honey Lake Valley over the east flank of the Fort Sage Mountains into Dry Valley, Bedell Flat, and Antelope Valley. A portion of this pipeline segment (3 miles in Honey Lake Valley, 8 miles in Dry Valley, and 5 miles in Bedell Flat) would be constructed adjacent to an existing right-of-way granted for the Tuscarora Gas Pipeline. Near the center of Bedell Flat, the Fish Springs Ranch pipeline would extend south to Antelope Valley where it would follow Antelope Valley Road within an existing Washoe County right-of-way to the intersection with Matterhorn Boulevard. The pipeline would parallel Matterhorn Boulevard southward within the existing right-of-way to a high point where it diverges east across a section of private property to the terminal storage tank located on public land. This storage tank location is on the drainage divide between Antelope Valley and Lemmon Valley. The Fish Springs Ranch water transmission pipeline would extend approximately 28 miles from the pump station in Honey Lake Valley to the terminal storage tank at an approximate elevation of 5500 feet above mean sea level (amsl) (**Figure 2-1**).

The Fish Springs Ranch water transmission pipeline has been designed to convey a maximum of 8,000 af/yr. The pipeline would have an operating pressure in excess of 150 pounds per square inch (psi), vary from 22 to 30 inches in diameter and be buried a minimum of 3.5 feet below ground surface. Design flow rate for the pipeline and main pump station is 6,000 gal/min, based on continuous operation for 20 hours per day. The limiting segment of pipeline is the 30-inch diameter, 24-mile long segment from the top of the pass in the Fort Sage Mountains, elevation 5520 feet amsl, to the terminal storage tank site, elevation 5510 feet amsl. Because the elevation of these two points is essentially the same, the hydraulic grade line at the tank at Fort Sage pass and the velocity and friction losses in this 30-inch diameter pipeline segment will control the amount of flow in the pipeline. This avoids the need for re-pumping in the Bedell Flat area, which would require additional infrastructure (booster pump station, power supply, surge suppression facilities, and maintenance roads). Collectively, these design features effectively limit the amount of water that can be delivered through the Fish Springs Ranch pipeline to a maximum of 8,000 af/yr.

Appurtenant facilities include air release and isolation valves and vaults, blow-off valves, cathodic protection devices, and telemetry and control facilities. These components would be located below existing grades in traffic rated lockable, concrete vaults varying in dimension from 3 x 2 feet to 8 x 12 feet and depths up to 8 feet. These facilities would be constructed about every mile along the alignment.

Pump Station

A pump station would be constructed adjacent to the storage tanks on Fish Springs Ranch private land in Honey Lake Valley in the SE¼ of Section 33, Township 26 North, Range 18 East, Washoe County, Nevada (**Figure 2-2**). The pump station would be designed to pump water from the adjacent storage tanks at an approximate elevation of 4210 feet amsl over the east flank of the Fort Sage Mountains at a maximum elevation of 5520 feet amsl. The pump station would be designed to provide 6,000 gal/min with a discharge pressure of 670 psi and would include a minimum of six vertical turbine pumps installed in suction barrels, an electrical/control room, and chemical feed room. The pump station would be a masonry block or metal building approximately 60 feet long by 40 feet wide.



Vicinity Map for
Fish Springs Ranch Pump Station Facility
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 2-2

A graded level area approximately 100 x 80 feet would be required for the pump station. Cut and fill slopes would have a maximum slope of 3:1 horizontal to vertical. An all-weather surface of compacted aggregate base and crushed rock surface would be constructed around the facility. A chain link fence with three strands of barbed wire on top would be constructed around the perimeter of the site. An alarm system notifying appropriate personnel of unauthorized entry would also be installed at the station.

Electrical Substation

An electrical substation would be constructed on private land by Sierra Pacific Power Company adjacent to the Alturas 345 kV transmission line near the pump station (**Figure 2-3**). A 24.9 kV powerline would be installed from the electrical substation to the groundwater extraction wells. The line would be constructed using single pole structures and extend approximately 10 miles (4 miles across public land/6 miles across private land) to the groundwater extraction wells. Locations of the pumping station and electrical substation are shown on **Figures 2-2** and **2-3**.

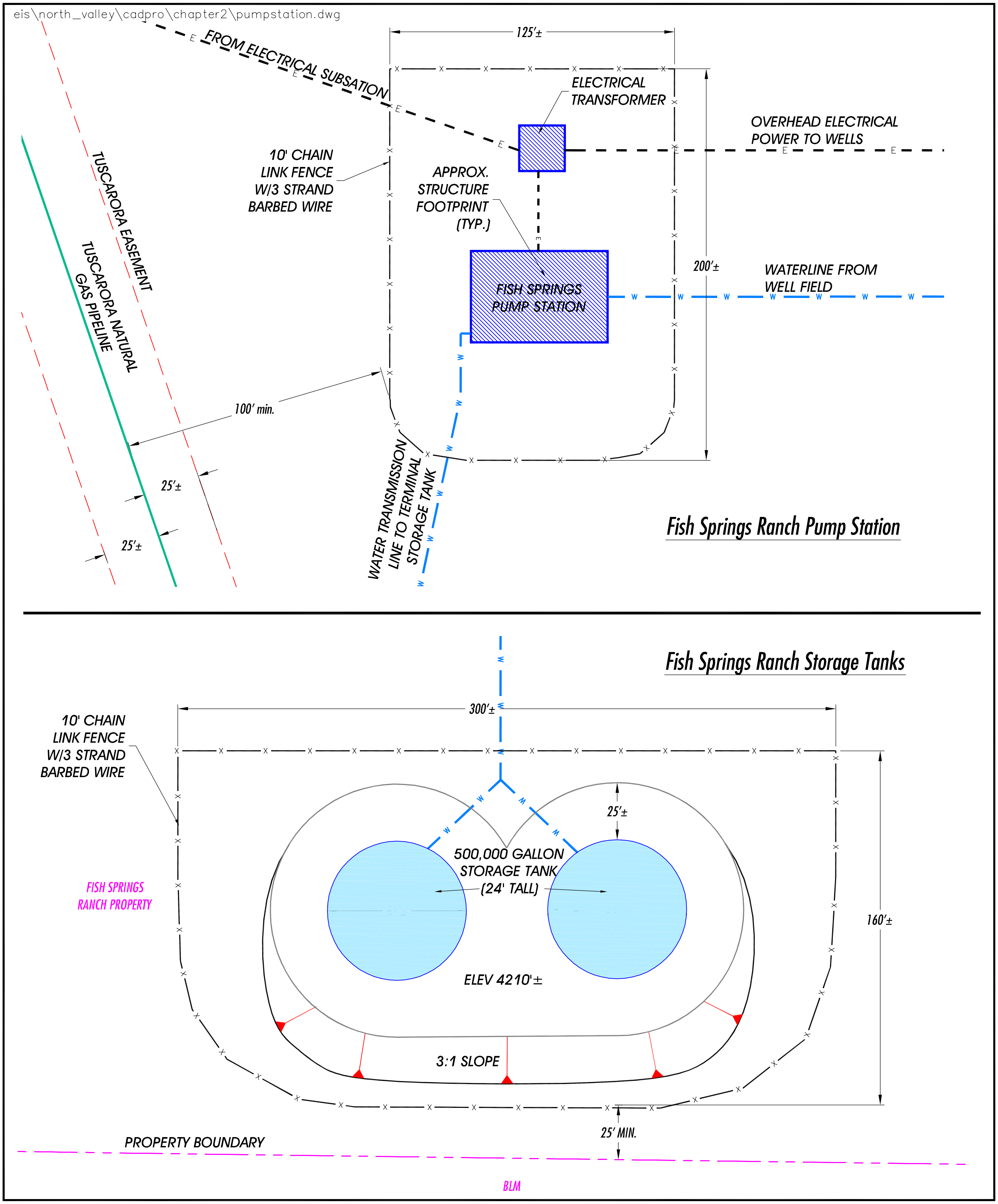
Surge Tank

A surge suppression facility including a tank with an estimated volume of 150,000 gallons would be located on a one-acre site along the east flank of the Fort Sage Mountains on public land (**Figure 2-4**). The surge tank would be located between 50 and 100 vertical feet above the high point of the pass west of the distribution line at an approximate elevation of 5520 feet amsl. A lateral pipeline from the transmission pipeline to the surge facility would be required. The tank site would have a perimeter chain link fence topped with three-strand barbed wire. A tank hatch would be fabricated with a lock box for added security and a tank ladder would be constructed in a manner to prevent unauthorized personnel from climbing the tanks.

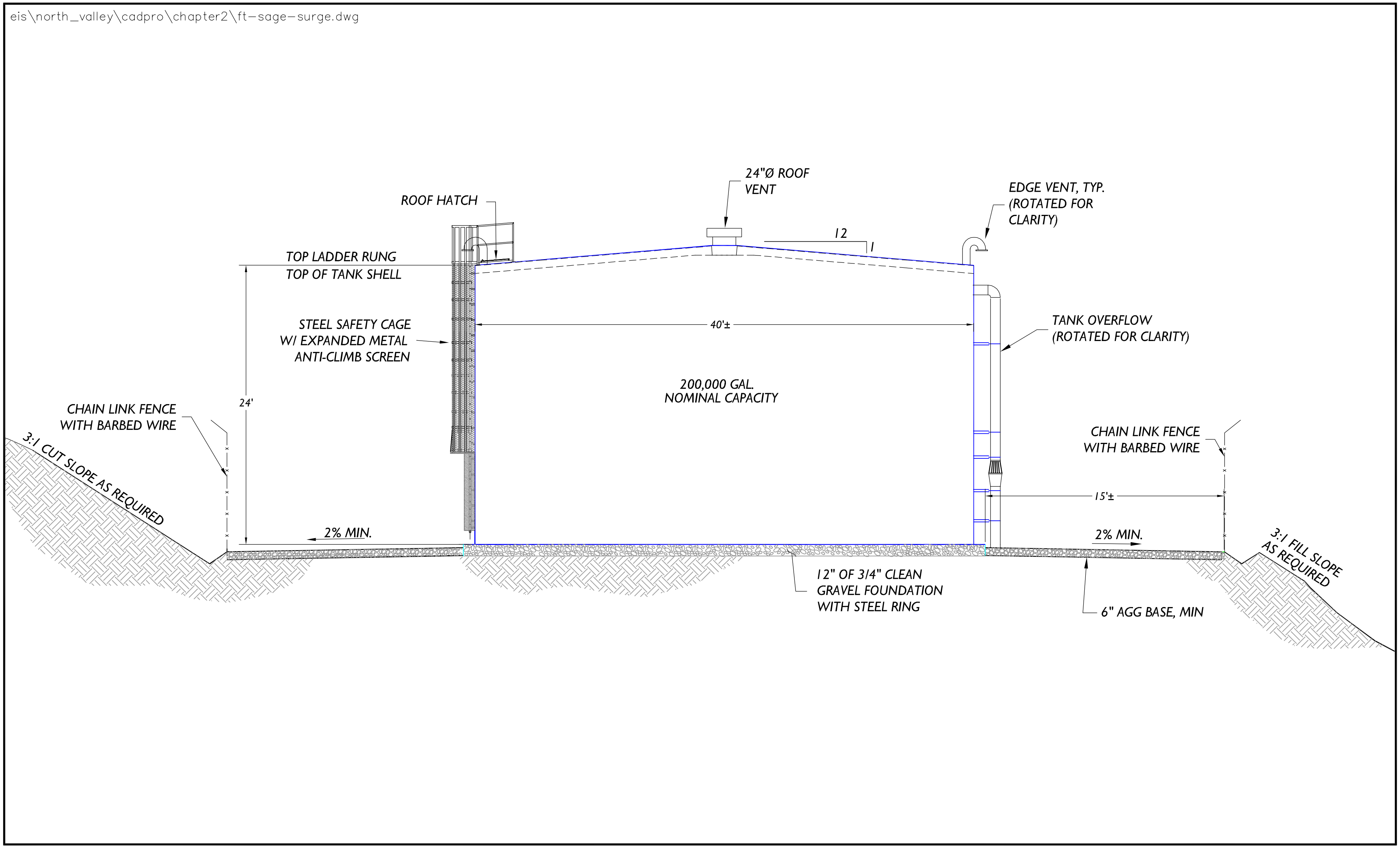
Water Storage Tanks

Two 500,000-gallon capacity water storage tanks would be constructed adjacent to the pump station on Fish Springs Ranch property in Honey Lake Valley (**Figure 2-3**). Each tank would be 24-feet tall by 61-feet in diameter constructed of welded steel in accordance with AWWA D100.

The terminal storage tank would be constructed at a pad elevation of 5510 feet amsl on a hillside between Antelope Valley and Lemmon Valley, immediately east and near the high point on Matterhorn Boulevard on public land administered by BLM (**Figure 2-1**). The tank would be designed in accordance with AWWA D100 standards and constructed of welded steel and measure 90 feet in diameter, 28 feet high, and have a capacity of 1.0 million gallons. Approximately 4 acres would be required for the tank. The tank site is sized to accommodate additional and/or larger storage tanks by Washoe County or Truckee Meadows Water Authority, if needed, for storage in the future. Piping to allow connection to the existing water distribution system would be provided by the water purveyor.



Fish Springs Ranch
Pump Station and Storage Tanks
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 2-3



Fish Springs Ranch
Fort Sage Surge Tank Facility
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 2-4

Storage tank sites would be graded level to minimize differential settling. Cut slopes would be terraced and planted with native vegetation for appearance and erosion control. Each site would have a perimeter chain link fence topped with three strands of barbed wire. Tanks would be constructed on a compacted aggregate foundation and painted to blend with the surrounding visual setting.

Water level in the terminal storage tank would control operation of the main pump station via telemetry. The proposed telemetry system consists of fiber optic cables between the main pump station and the terminal storage tank. The fiber optic cables would be buried in a common trench with the pipeline. Small, below-grade concrete vaults would be provided periodically (about every 5 to 7 miles) along the alignment for splicing sections of cable together. At the terminal tank site, telemetry equipment would be configured to ultimately integrate with either the Washoe County or Truckee Meadows Water Authority telemetry control system. At the main pump station, the telemetry system to the six wells would be a continuation of the fiber optic system, or a radio telemetry system. A radio telemetry system would include a small antennae and receiver at each facility. The radio telemetry facilities would be located on Fish Springs Ranch property, and no additional repeater stations are anticipated.

Water Treatment

A sodium-hypochlorite solution would be used to disinfect groundwater and provide chlorine residual in the transmission pipeline. This solution is readily available in both drums and bulk at 12.5 percent concentration. The solution would be stored in an above-ground, high-density polyethylene (HDPE) tank located within the pump station building. Secondary containment and related facilities would be provided in accordance with applicable Washoe County Building Department and Uniform Fire Code regulations. The storage tank would be up to 2,500 gallons in capacity. Periodic chemical deliveries would be required approximately once every three weeks.

Pipeline Construction

Construction of the Fish Springs Ranch water transmission pipeline would require a permanent 50-feet wide right-of-way and an additional 25-feet width as temporary right-of-way to accommodate trench excavation, backfill, and equipment operation. Wider temporary construction easement areas (150 x 150 feet) designated for staging equipment and material would be at approximately 1-mile intervals along the pipeline route. Staging areas would not be located in drainages and would avoid known cultural resources. Prior to construction, available topsoil would be stripped and stockpiled for reclamation purposes. Existing roads and trails would be used whenever possible during construction to access the pipeline right-of-way. Construction would involve grading, trenching, installing pipe, and backfilling the trench. Once installed and operating, the permanent right–of-way for the pipeline and access road would have a width of 50 feet. During operation, the pipeline route would be inspected monthly to record corrosion-control readings. All disturbed areas would be reclaimed and revegetated.

Conventional construction techniques would be implemented for unimproved roadway, improved roadway, and cross-country segments of the pipeline. Access to proposed pipeline alignment would be via the pump station in the north, U.S. Highway 395 and Red Rock Road from the west, Winnemucca Ranch Road from the east, and Lemmon Valley Drive from the south (**Figure 2-1**).

Unimproved Roadway

Segments of pipeline proposed within unimproved roadways would be installed near the edge of the roadway or beyond the roadway drainage area. Pipe stringing and placement of pipe segments along the alignment would occur on the opposite side of the roadway from the installation side, and would be placed outside the roadway section for access and safety considerations. Trench excavation would require use of an excavator or trenching machine. Haul trucks would stage adjacent to the excavator in the roadway section, necessitating traffic control and periodic lane closures as necessary. Haul trucks would transport excavated material to selected locations for processing and use as backfill. At the end of each working day, installation of pipeline and backfill to finished grade to the excavation limits for that day would be completed, and construction equipment would be removed from the roadway.

Improved Roadway

If it becomes necessary to install portions of the pipeline within roadway pavement sections, the pipeline would be installed in the center of the traffic lane. Roadway asphalt would be saw-cut to the centerline to avoid a joint in the wheel line. The structural roadway section would be replaced to match existing surface. At the end of each working day, installation of pipeline and backfill to finished grade to the excavation limits for that day would be completed, and construction equipment moved from the roadway to an approved location. Backfill at grade would be Class 2 aggregate base, which would allow roadway usage until such time as pavement is re-installed.

Cross Country

Segments of pipeline designated for installation through open areas would first be graded to provide access for delivery of materials. This operation would consist of blading an area to the approximate limits of the construction easement. Bladed material would be stockpiled along the edge of the right-of-way and placed over the disturbed area upon completion of construction. The operation would use an excavator or trenching machinery to excavate the pipeline trench along one side of the easement to allow use of the remaining area for stringing pipe and staging materials.

In areas with hard, unweathered rock, blasting may be necessary to fracture the rock to allow use of an excavator. Blasting criteria would be established to limit peak particle velocities and ground accelerations to avoid damage to existing facilities.

Backfill Material

Portions of excavated material encountered during construction would be screened and used as pipe bedding. Screened by-products could be used as intermediate backfill, spread on the surface of the right-of-way, or transported off-site to an approved disposal location.

Stream Crossings

The following measures would be implemented where the proposed water transmission pipeline would cross streams, wetlands, or riparian areas:

- Expedite construction in streams and wetlands to minimize the duration of turbidity-causing activities.
- Select an alignment that minimizes stream crossings.
- Schedule construction of stream crossings during periods of low or no flow.
- Implement temporary erosion and sediment control practices.
- Restore stream banks and wetlands to original configuration as soon as possible.
- Stabilize stream banks and adjacent areas with permanent erosion control and vegetation as soon as possible.
- Periodically inspect the right-of-way during and after construction to identify and perform maintenance activities.

Fish Springs Ranch Conversion Plan

The Fish Springs Ranch Conversion Plan would be implemented in response to diversion of the current seasonal water use of approximately 4,200 af/yr for alfalfa hay production to support the 8,000 af/yr importation to the Stead/Lemmon Valley area (Fish Springs Ranch Proposed Action). Approximately 1,242 acres would be converted under this plan (Walker and Associates 2003). Goals of the Conversion Plan include:

- Transition most alfalfa fields to perennial dryland plants providing forage for livestock and wildlife, prevent weed invasion, and establish a self-sustaining vegetative cover without additional water application.
- Develop an economically viable 500 head cow-calf operation using existing public range permits and private land range resources.
- Adjust ranching operations based upon response of the aquifer to pumping for water supply outlined

in the Proposed Action.

Current planning is based on the ranch conversion occurring over a 3-year period. Alfalfa field conversion would be initiated at an appropriate time by application of herbicide to eliminate the alfalfa plants. This step is followed by drill seeding with crested wheat grass, kochia, and fourwing saltbrush. Light irrigation would be implemented to enable grass and other plants to become established and form seed heads. Conversion of the alfalfa hay producing fields to the species identified above is intended to not only establish a sustainable dry-land vegetative cover to support future livestock operations, but would also control fugitive dust that could result from the elimination of irrigation practices.

Proposed Water Resources Monitoring

With respect to construction of the water transmission pipeline and associated facilities, no water monitoring is proposed. The storm water control permit that may be required by the State for construction activities could include some surface water monitoring requirements during a storm event. Requirements to monitor groundwater withdrawal and water quality from production wells associated with the Fish Springs Ranch's proposed Project are under the jurisdiction of the Nevada State Engineer, Washoe County Health Department, Washoe County Department of Water Resources, and Truckee Meadows Water Authority. Fish Springs Ranch's proposed water resource monitoring program with respect to proposed groundwater pumping is described in **Appendix D** – *Recommended Water Resources Monitoring and Management Plan.*

Proposed Vegetation Monitoring

Fish Springs Ranch would monitor vegetation for a minimum of 2 years following construction of the pipeline to evaluate revegetation trends, check potential for erosion, and compare revegetation with adjacent undisturbed vegetation. During the first growing season following revegetation, reclaimed areas would be quantitatively and qualitatively evaluated to determine initial plant establishment and identify areas where erosion may occur. First year monitoring would include plant density, percent woody plant survival, and total canopy cover. Measurements would occur in random plots in each re-established plant community. Refer to the following "*Reclamation*" section for additional information about revegetation of disturbed areas.

Employment

Approximately 160 workers would be used to construct the Fish Springs Ranch proposed pipelines, wells, and associated components. Construction of the Project would require approximately 11 months to complete (ECO: LOGIC 2004).

Reclamation

Reclamation activities on public land for the proposed Fish Springs Ranch Project would be designed to achieve post-construction land uses consistent with BLM's Carson City Field Office Consolidated Resource Management Plan (BLM 2001a). Reclamation is intended to return disturbed land to a level of productivity comparable to pre-construction levels. Post-construction land use includes wildlife habitat, livestock grazing, and dispersed recreation.

Short-term reclamation goals would be to stabilize disturbed areas and protect adjacent undisturbed areas from unnecessary or undue degradation. Long-term reclamation goals would ensure public safety, stabilize the sites, and establish productive vegetative communities consistent with post-construction land use. As sections of the pipeline are completed, Fish Springs Ranch would initiate reclamation activities concurrent with ongoing construction activities.

Areas disturbed during construction of the Fish Springs Ranch pipeline and associated components would be rehabilitated to minimize potential for erosion and encourage establishment of native vegetation. This process includes topsoil salvage, recontouring disturbed areas, distribution of stockpiled topsoil, installation of erosion control features and products, seeding, monitoring, and maintenance.

As the trench excavation and pipeline construction advances, a minimum of 3 inches and maximum of 12 inches of topsoil would be salvaged. Topsoil would not be salvaged where noxious weeds are present. Topsoil storage piles would be placed along the edge of the right-of-way and protected. After the trench has been backfilled, right-of-way regraded, and subsoil ripped to reduce compaction, topsoil would be re-distributed over the area and seeded. Seed mixtures would include species present in pre-construction communities. Use of native grasses, forbs, and shrub species would be emphasized.

Temporary and permanent erosion control measures would be installed during construction. Temporary structures would remain in-place until permanent revegetation and erosion control devices are effective. During construction, water bars, silt fencing, straw bale sediment barriers, erosion control matting, interim mulching, and water flow energy dissipaters would be installed. Erosion and sediment control measures would be regularly monitored and maintained during the project. Erosion control measures would be in accordance with Best Management Practice (BMPs) as defined by the Nevada State Conservation Commission (1994).

INTERMOUNTAIN WATER SUPPLY PROPOSED ACTION

Intermountain Water Supply is proposing construction of water production wells, water collection and transmission pipelines, pump station, two water demand tanks, diesel powered generators, and electrical distribution lines to convey water from Dry Valley (2,000 af/yr from five wells) and Bedell Flat (500 af/yr from two wells) approximately 24-miles to a pipeline terminus in Lemmon Valley (Intermountain Water Supply 2005). A pipeline terminal storage tank would be provided by Washoe County, Truckee Meadows Water Authority, or other private entities. Intermountain Water Supply pumping and pipeline facilities would be sized to convey approximately 2,500 af/yr. Proposed Intermountain Water Supply project components are shown on **Figures 2-5** and **2-6**.

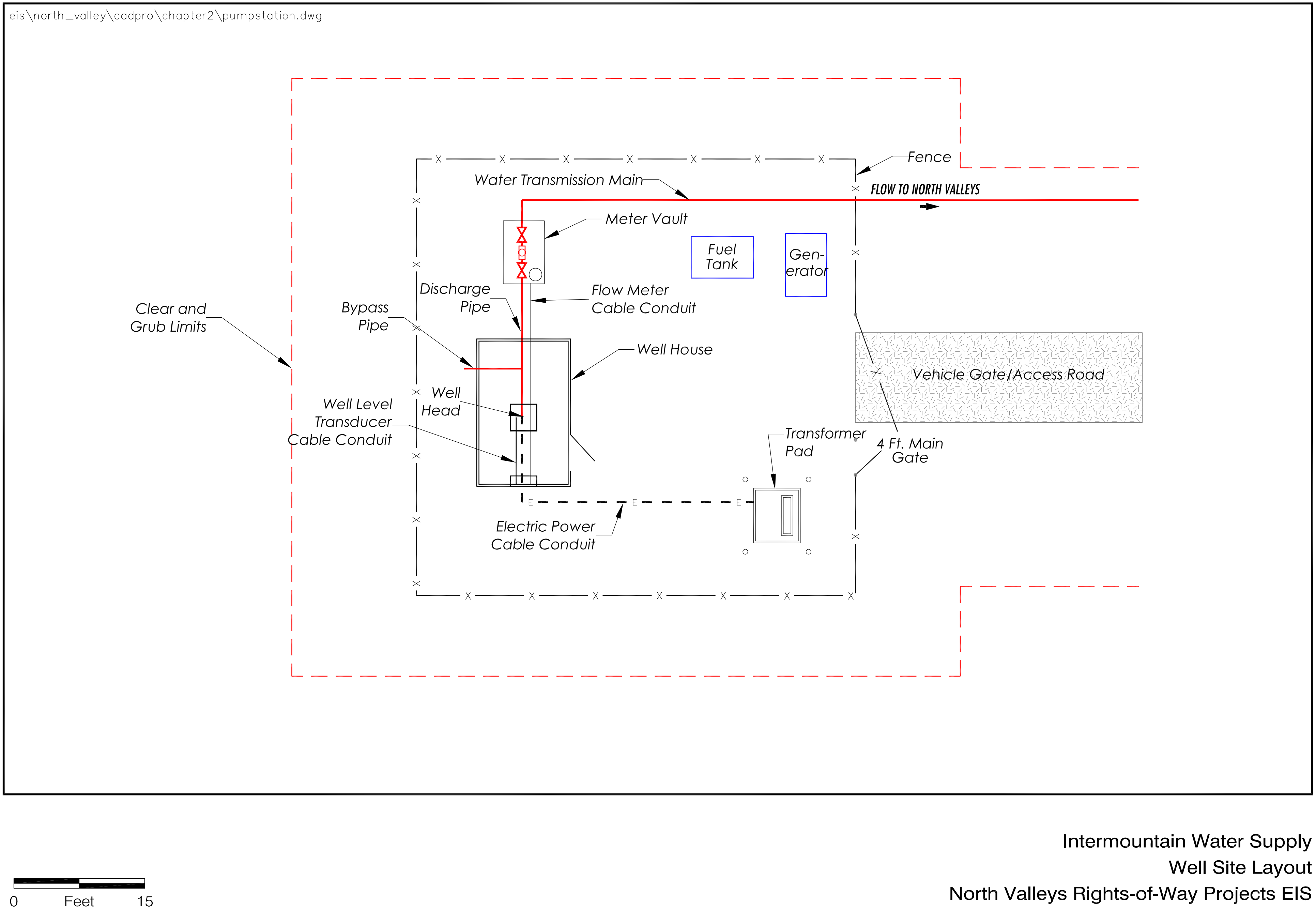
The Proposed Action described in the Draft EIS for this project (BLM 2005) specified that 3,000 af/yr would be pumped from Dry Valley. Based on a review of public comments and groundwater modeling results, Intermountain Water Supply reduced its proposed pumping rate in Dry Valley to 2,000 af/yr. Intermountain Water Supply holds water rights for an additional 1,000 af/yr of water in upper Dry Valley. In order to exercise this water right, however, Intermountain Water Supply would need to complete one or more additional wells, install additional pipeline, and construct associated infrastructure. Such development would require acquisition of an amended or new right-of-way across public land before production of this additional water right could be initiated.

Development of the Intermountain Water Supply Project would occur incrementally in three stages. The first stage would involve completing three to four production wells in Dry Valley (DV-1 through DV-4), installing a water transmission pipeline from Dry Valley to a terminus in Lemmon Valley, constructing a pump station, installing two water demand tanks in Bedell Flat, and installing radio telemetry towers. The first stage would provide up to 1,500 af/yr of water to the Stead/Lemmon Valley Area.

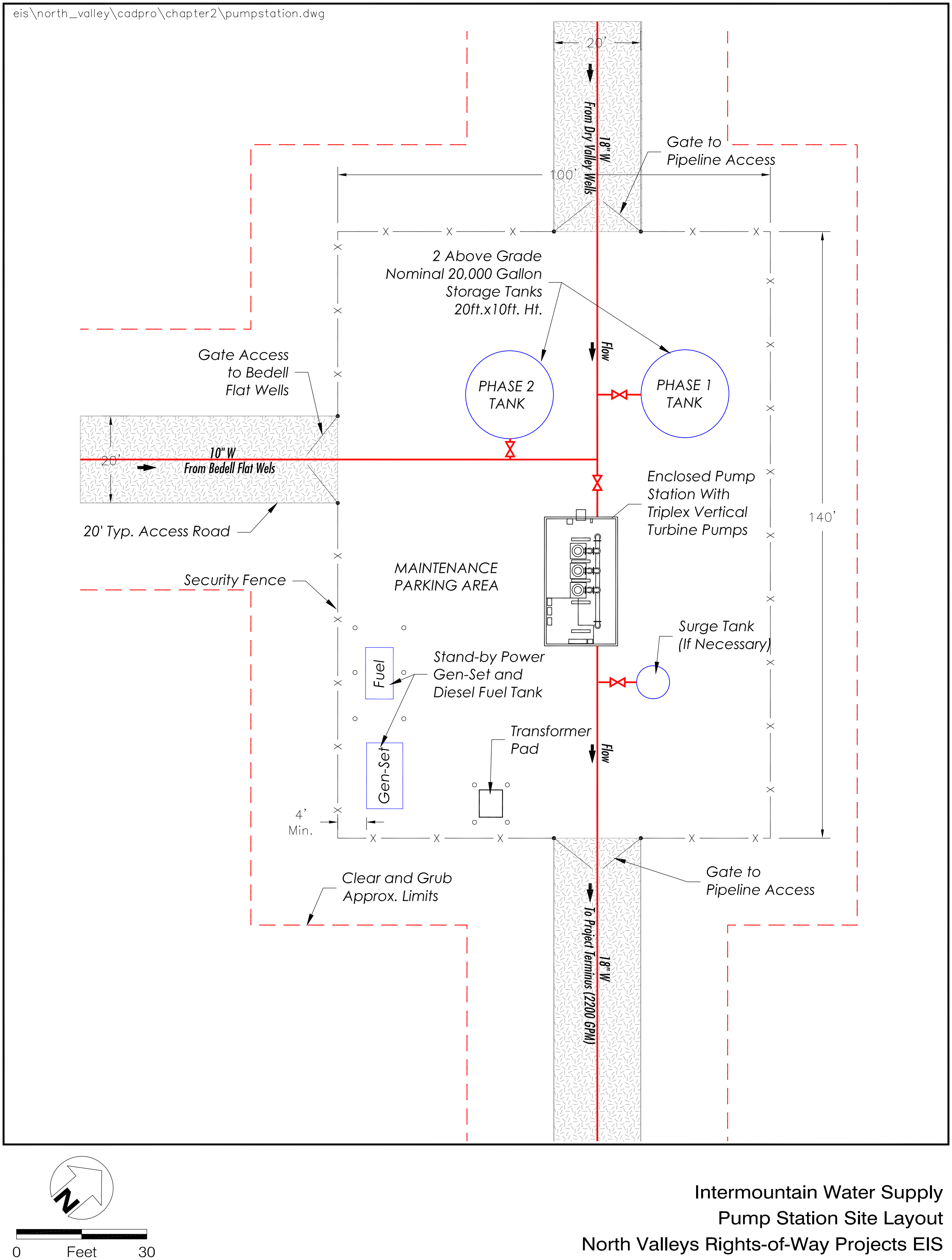
The second stage of development would involve completing one to two additional production wells in Dry Valley (DV-4 and DV-5), installing connecting water pipeline, and constructing electrical distribution lines to the two production wells and booster pump station in Bedell Flat. Wells DV-4 and DV-5 would produce up to 500 af/yr to the Stead/Lemmon Valley Area.

The third stage of development would include completing one to two production wells in Bedell Flat (BF-1 and BF-2) that would produce up to 500 af/yr, and connecting water pipeline and electrical distribution lines to the pump station. Wells BF-1 and BF-2 would be located about ½-mile southwest of the pump station.

The Dry Valley production wells and booster station in Bedell Flat would be serviced by electrical power provided through installation of a powerline by Plumas-Sierra Electric Cooperative from their existing service in Constantia, California and Red Rock Valley. The powerline to Dry Valley wells would be located on private land except for approximately 5,000 feet to be located on public land. Powerline service to the Dry Valley wells would be buried along the route shown on **Figure 2-5.** Above-ground powerlines would be installed to provide service from existing service in Red Rock Valley to the booster station and production wells in Bedell Flat (**Figure 2-5**). Diesel generators and fuel tanks would be installed at some of the wells and booster stations in Dry Valley and Bedell Flat to serve as backup power sources for emergency operations.



Intermountain Water Supply
Well Site Layout
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 2-5



Intermountain Water Supply
Pump Station Site Layout
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 2-6

Production Wells

Estimated depths of production wells installed as part of this proposed Project would range from approximately 500 to 1000 feet. A 4,000-gallon double-walled above-ground storage tank would be used for storage of diesel fuel. Each well site would be within a fenced area approximately 50 x 50 feet. Well-head equipment would include vertical turbine pumps and level controls, yard piping, electrical and cable conduit, flow meter vault, a 10 x 18 feet well house with various valves, meters, electrical, and control equipment. Each well site would be fenced for security with 6-foot high chain-link fencing topped with a 2-foot high band of razor wire. Light-colored lath would be incorporated into the chain-link to reduce visual contrast.

Construction of well-head sites would take up to 4 weeks and include concrete flatwork, well house construction, installation of electrical controls, and yard piping. A three-person drilling crew could complete a production well in about 3 weeks.

Pipelines

The Intermountain Water Supply pipeline route would begin in Dry Valley and traverse east across private and public land to the existing Tuscarora Gas Pipeline. At that point, the pipeline would follow the Tuscarora Gas Pipeline corridor southeast from Dry Valley into Bedell Flat. At a point along the Tuscarora Gas Pipeline in eastern Bedell Flat, the pipeline route would turn south to Antelope Valley. The pipeline would follow approximately 10 miles of Washoe County rights-of-way and then easements through Antelope Valley to Lemmon Valley, north of Reno-Stead Airport. The pipeline would then traverse Washoe County, BLM, and Airport Authority land to the pipeline terminus.

Intermountain Water Supply proposes to install a 16-inch diameter collection pipeline connecting wells in Dry Valley. From the Dry Valley wells to the Project high point beyond the booster pump station in Bedell Flat, an 18-inch diameter line would be installed. A 12-inch diameter pipeline would extend from the Project high point to the terminus site in the Stead/Lemmon Valley Area.

Pipe used to construct the Intermountain Water Supply pipeline would be one of the following types: steel pipe, HDPE pipe, ductile iron pipe (DIP), or PVC pipe. Two basic types of installation are used for these types of pipe: welding and push-on. Steel and HDPE pipe are installed with a welding procedure. DIP and PVC are installed with a push-on procedure.

A terminal storage tank would be the responsibility of the water purveyor – Washoe County, Truckee Meadows Water Authority, or another private entity. Additional distribution system piping to allow connection to the existing distribution system located south of the Reno-Stead Airport would be provided by the water purveyor.

Pump Station

The pump station would be located on public land administered by BLM in Bedell Flat. Surface disturbance associated with construction of the station would be approximately 140 x 180 feet. A 6-foot chain link security fence with 2-feet of razor wire would enclose an area 100 x 140 feet. The pump station would include two 20,000-gallon water storage tanks approximately 20-feet wide by 10-feet high. A 750 hp diesel powered generator would initially be used to power the pump station. A 4,000-gallon double-walled aboveground storage tank would be used for storing diesel fuel. After installation of electrical distribution lines, diesel generators would be used for emergency backup power.

The pump station building would be about 20 x 30 feet and 10-feet high enclosing three vertical turbine pumps. The pump package would likely include pumps, valves, and fittings mounted on a steel skid ready for installation and connection to suction and discharge piping. Construction of the pump station would require about 6 weeks.

Radio Telemetry Towers

A typical telemetry site would consist of a 20-inch solar panel and antenna mounted on a pair of steel posts set in concrete. The telemetry sites would have dimensions of about 10 x 10 feet and would be accessed by existing roads or helicopter. Locations of telemetry sites are shown on **Figure 2-1**.

Water Treatment

The Intermountain Water Pipeline would include chlorination of well water. Chlorination equipment would be housed at the booster pump station in Bedell Flat. Liquid sodium hypochlorite at nominal 12.5 percent solution strength would be used for disinfection. While the pumps are operating, sodium hypochlorite would be pumped by positive displacement metering pumps at a fixed rate into the discharge pipeline. The transmission pipeline would act as the chlorine contact chamber. At full build-out flow, travel time for the 2,200 gal/min flow is approximately 7 hours, 20 minutes. At a dosing rate of 2 milligrams per liter (mg/L) chlorine, up to 53 gal/day of 12.5 percent sodium hypochlorite solution would be required. To maintain adequate stocks of liquid sodium hypochlorite, two separate bulk storage tanks would be installed at the site. The tanks would be housed in a separate room inside the pump station. Initially, two 250-gallon bulk storage tanks would be used, expanding up to two 1,000-gallon storage tanks when the Project is completed.

Pipeline Construction

No construction activities would occur when surface conditions on the right-of-way or access roads are too wet to adequately support construction equipment. Fences crossing the right-of-way would be braced, cut, and temporarily fitted with gates to permit passage of construction traffic and survey monuments located within the right-of-way would be protected during construction activities.

Preparation of the right-of-way would include debris disposal, growth media salvage, and land leveling. Where present, 4 to 6 inches of surface materials would be separated and stored as growth media. Growth media and subsoil would be placed in separate stockpiles along side of the right-of-way for subsequent use in reclamation activities. The maximum width of disturbance along the pipeline route during construction would not exceed 80 feet.

The pipeline trench would be excavated using conventional backhoes or trenching machines. Where rock formations are encountered, tractor-mounted mechanical rippers or blasting would be necessary. A typical trench would be excavated to a depth of 72 inches with widths ranging from 32 to 40 inches.

State highways and other developed road crossings would be done using boring methods. Borings require excavation of a bell hole at either side of the crossing and auguring a horizontal hole under the roadway. Where necessary, a pipe casing would be inserted into the boring and the water pipeline placed within the casing.

Pipe segments would be placed adjacent to the trench and joints welded (steel) or heat butt fusion (HDPE) techniques applied to seal the joints. Once the pipe has been welded/fused and inspected, it would be lowered into the trench using side-boom tractors. For push-on pipe installation, each segment of push-on pipe would be lowered into the trench, where the plain end of one segment of pipe would be pushed into the spigot of another segment of pipe. A lubricated gasket in the pipe spigot would complete the seal.

Inspection during installation would verify minimum cover is provided, bottom of the trench is free of rocks and debris, external pipe coating (steel) is not damaged, and the pipe is properly fitted and placed in the trench. Pipe bedding material would consist of a 6-inch layer of pea gravel or compacted sand placed in the bottom of the trench. Bedding material would be placed around and above the pipe to a minimum thickness of 6-inches over the pipe. Backfilling the trench would occur after the pipeline has been placed in the trench and final inspection completed. Backfill would generally consist of material originally excavated. Subsoil would be placed first followed by redistribution of stockpiled growth media. Excess excavated materials would be properly disposed of in accordance with applicable regulations or jurisdictional agency requirements. When possible, excess excavated materials would be spread over the right-of-way to avoid off-site disposal.

The following measures would be implemented to reduce construction impacts in populated areas:

- Notify residents prior to commencement of construction operations.

- Use traffic control measures to minimize road access and traffic flow interruptions.

- Use temporary bridges to maintain access to residential and business areas.

- Use barricades or other appropriate traffic control devices when trenches are open at active construction sites.

- Water road surfaces and spoil storage areas to minimize fugitive dust.

- Avoid removing mature trees and landscaping within the construction work zone unless necessary for safe operation of equipment or installation of piping.

- Restore disturbed landscaping to pre-construction levels.

- Promptly repair any damage to private property caused by construction activities.

Two seven- to eight-person crews (one crew proceeding in each direction) would be used to construct and install the pipeline. Additional personnel would be used for surveying and staking the right-of-way, clearing and grubbing, dust control, reclamation, and testing.

After completion of construction, a permanent 20-foot wide right-of-way would be maintained for access and maintenance. The existing road associated with the Tuscarora Gas Pipeline would be used along the shared segment.

Blasting

Where rock formations are encountered and use of tractor-mounted mechanical rippers or rock trenching equipment are not effective for trench construction, blasting may be used. In areas where blasting is necessary the following safety precautions would be implemented:

- In areas of human use, blasting would be blanketed (matted).

- Persons in close proximity to blasting areas would be notified in advance to ensure livestock and property is protected.

- Before blasting, check the affected area to ensure personnel and equipment are out of the danger area.

- Station flagmen at safe distances to control traffic and protect the public where blasting would occur adjacent to public or private roads.

- Use cautionary measures to avoid damage to underground structures, cables, pipelines, springs, wells, or other water supplies.

- Avoid blasting in stream channels without prior consultation with appropriate jurisdictional agencies.

Stream Channel Crossings

Stream channel crossings would be constructed in accordance with the Nevada Temporary Permit Application for Working in Waterways, U.S. Army Corps of Engineers nationwide permit requirements, and land management agencies. Environmental protection measures include the following:

- Use appropriate soil erosion and sediment controls and maintain equipment in effective operating condition during construction. Exposed soil, as well as any work below the ordinary high water mark, would be permanently stabilized at the earliest practicable date. Efforts would be made to work during periods of low-flow or no-flow in drainages.

- Place mats on ground surface where heavy equipment would be working in wetlands, or use other measures to minimize soil disturbance.

- To the extent practicable, design activities so that preconstruction downstream flow conditions would be maintained. Do not allow activities to permanently restrict or impede passage of normal or expected high flow in drainage channels.

Fire Prevention

A designated Intermountain Water Supply representative in charge of fire control would be on-site during construction activities. Personnel affiliated with the Project would comply with all rules and regulations concerning use, prevention, and suppression of fires on public land administered by BLM. Fires resulting from construction activities would be immediately reported to BLM. In addition, the following fire prevention measures would be implemented:

- Have fire fighting tools and equipment available in the event of fire.

- Conduct welding or use of acetylene torches in an area cleared of flammable material.

- Assist each welder by using a helper equipped with a fire extinguisher and shovel to extinguish flames started by welding sparks.

- Do not store chemicals, fuels, and lubricants within 300 feet of a stream crossing.

- Transport gasoline, oil, and lubricants in approved containers in accordance with National Fire Protection Association Code.

- Equip internal combustion engines with spark arresters, unless equipped with a turbine-driven exhaust supercharger; multi-position engine, such as on chainsaws; passenger vehicle or light truck equipped with a factory designed muffler and exhaust system in good working condition; or heavy truck used for hauling, equipped with a factory-designed muffler and vertical stack exhaust system extending above the cab.

Testing

The installed pipeline would be hydrostatically tested to ensure performance specifications are met. Hydrostatic testing would entail filling the pipe with water and maintaining a requisite pressure for a specified period of time. Hydrostatic tests would be conducted sequentially transferring test water from one segment to the next.

Hydrostatic tests are typically conducted with water containing dissolved chlorine or another sanitizer. A sample of sanitized solution would be withdrawn after testing to determine level of biological activity within the pipeline. Upon successful completion of a hydrostatic test and water samples meet biological standards; the pipeline would be placed into service.

Corrosion Protection

Welded steel pipe would be protected from corrosion with external pipeline coating and cathodic protection. Cathodic protection includes placement of impressed current rectifiers and anode ground beds at various locations. Rectifiers would be located near power distribution lines and mounted on a pole adjacent to the right-of-way. Anodes would be buried in the pipe trench.

Proposed Water Resources Monitoring

No water monitoring is proposed for construction of the water transmission pipeline and associated facilities. The storm water control permit that may be required by the State for construction activities could include some surface water monitoring requirements during a storm event. Requirements to monitor groundwater withdrawal and water quality from production wells associated with Intermountain Water Supply's proposed Project are under the jurisdiction of the Nevada State Engineer, Washoe County Health Department, Washoe County Department of Water Resources, and Truckee Meadows Water Authority. Intermountain Water Supply's proposed water resource monitoring program with respect to proposed groundwater pumping is described in **Appendix D** – *Recommended Water Resources Monitoring and Management Plan.*

Proposed Vegetation Monitoring

Intermountain Water Supply would monitor vegetation for a minimum of 2 years following construction of the pipeline to evaluate revegetation trends, check potential for erosion, and compare revegetation with adjacent undisturbed vegetation. During the first growing season following revegetation, reclaimed areas would be quantitatively and qualitatively evaluated to determine initial plant establishment and identify areas where erosion may occur. First year monitoring would include plant density, percent woody plant survival, and total canopy cover. Measurements would occur in random plots in each re-established plant community. Refer to the following "*Reclamation*" section for additional information about revegetation of disturbed areas.

Employment

Approximately 60 workers would be employed during construction of the Intermountain Water Supply pipeline project including drilling crew, concrete flatwork, electricians, plumbers, pipe fitters, steel workers, equipment operators, carpenters, surveyors, and laborers. Construction and development are expected to require approximately 10 to 12 months.

The work schedule would include 8- to 10-hour shifts 5 days per week. Trenching, stringing, pipe installation, and backfilling would be conducted by a seven to eight-person crew. Most of the work force for the Project would come from the existing labor pool in the Reno-Sparks area.

During operation of the pipeline, workforce requirements would be in the areas of equipment performance and observation, preventative maintenance, normal repair work, and record keeping. This work would include monthly tours of the pipeline and weekly visits to the storage tank sites.

Reclamation

Reclamation activities on public land for the proposed Intermountain Water Supply Project would be designed to achieve post-construction land uses consistent with the Carson City Field Office Consolidated Resource Management Plan (BLM 2001a). Reclamation is intended to return disturbed land to a level of productivity comparable to pre-construction levels. Post-construction land use includes wildlife habitat, livestock grazing, and dispersed recreation.

Short-term reclamation goals would be to stabilize disturbed areas and protect adjacent undisturbed areas from unnecessary or undue degradation. Long-term reclamation goals would ensure public safety, stabilize the sites, and establish productive vegetative communities consistent with post-construction land use. As sections of the pipeline are completed, Intermountain Water Supply would initiate reclamation activities concurrent with ongoing construction activities.

Prior to placing growth media, areas disturbed during construction of the Intermountain Water Supply pipeline would be graded to blend with surrounding topography. Regraded surfaces would be ripped where necessary prior to placement of growth media. Ripping would reduce compaction, provide a uniform seed bed, and help establish contact between the seed and soil. A BLM-approved seed mix would be broadcast over disturbed areas and harrowed into the growth media.

ALTERNATIVES TO PROPOSED ACTIONS

This section describes alternatives to the Proposed Actions including the No Action Alternative, Alternatives Considered but Eliminated from Detailed Analysis, and the Agency Preferred Alternative. Alternatives selected by BLM for consideration in this EIS are based on potential impacts or issues associated with the Proposed Actions, including those identified by the public during the scoping process. BLM is required to analyze environmental effects resulting from the Proposed Actions and to identify reasonable alternatives that would mitigate or eliminate potential impacts from the Proposed Actions. BLM is also required to analyze the No Action Alternative and describe the environmental consequences that would result if the Proposed Actions are not implemented.

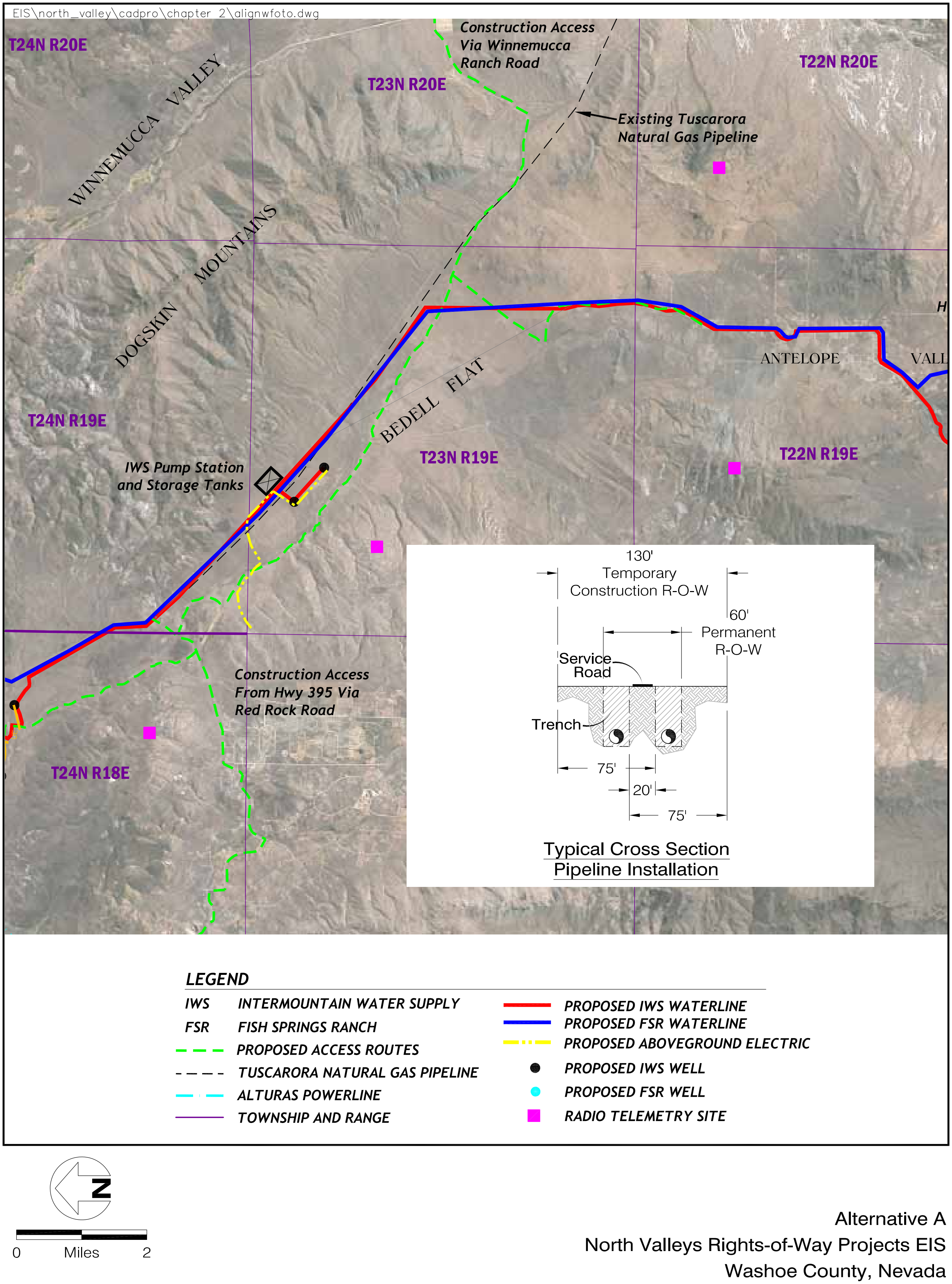
Major components of the proposed development, respective functions, and potential environmental effects resulting from implementation of these activities are considered in development of alternatives. Impacts that cannot be mitigated may require one or more alternatives. Other alternatives were considered early in the review process. These alternatives were eliminated because they were either technically or economically infeasible or provided no environmental advantage over the Proposed Actions.

ALTERNATIVES CONSIDERED IN DETAIL

Alternatives to the Proposed Actions include: construction of water transmission pipelines using a common right-of-way; and the No Action Alternative.

Alternative A – Construct Pipelines within Common Right-of-Way

Alternative A would be comprised of all components of the Proposed Actions including installation of wells, collection pipelines, pump stations, surge tanks, a terminal tank (associated with Fish Spring Ranch's Proposed Action), diesel generators (associated with Intermountain Water Supply Proposed Action), electrical distribution lines, and substation (for Fish Springs Ranch Proposed Action), but would require that both pipelines be constructed within a common right-of-way for a portion of the right-of-way (**Figure 2-7**). Alternative A would require that Fish Springs Ranch and Intermountain Water Supply construct their individual pipelines inside a common 130-foot-wide right-of-way extending from the point of intersection of the Intermountain Water Supply pipeline and Fish Springs Ranch pipeline in Dry Valley to a point in Antelope Valley where each pipeline diverges to their respective terminus sites. Alternative A would follow the proposed alignment of the Intermountain Water Supply pipeline. Total linear distance shared by the proposed Intermountain Water Supply pipeline corridor and Fish Springs Ranch corridor would be about 13.5 miles (2 miles in Dry Valley, 6.5 miles in Bedell Flat, and 5 miles in Antelope Valley).



Alternative A
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 2-7

Alternative A would result in common permanent 60-foot-wide right-of-way with single access/service road (i.e., each pipeline would be located within a common 60-foot-wide right-of-way). Use of a common right-of-way would reduce surface disturbance by about 28 acres (**Table 2-1**).

No Action Alternative

Under the No Action Alternative, the Proposed Actions would not be constructed. Fish Springs Ranch and Intermountain Water Supply would not develop rights-of-ways across public land. Potential impacts predicted to result from development of the Projects would not be realized. Groundwater pumping in any of the basins could occur under approved permits.

TABLE 2-1
Proposed Surface Disturbance
Proposed Actions and Alternative A
North Valleys Water Projects

	Public Land (acres)	Private Land (acres)	Total Land (acres)
PROPOSED ACTION			
Fish Springs Ranch			
Well Development	-	18	18
Well Field Collection Pipelines	33.5	58.3	91.8
Electrical Substation	-	13.9	13.9
Pump Station	-	0.5	0.5
Pump Station Storage Tanks	-	1.1	1.1
Fort Sage Surge Tank	1	-	1
Pipeline Construction Right-of-way (75 foot width)	181.3	77.6	258.9
Equipment Staging Areas	5	0.5	5.5
Terminal Storage Tank	4	-	4
Fish Springs Ranch Subtotal	**224.8**	**169.9**	**394.7**
Intermountain Water Supply			
Well Development	0.15	0.2	0.3
Pump Station	0.6	-	0.6
Pipeline Construction Right-of-way (75 foot width)	136	98	234
Equipment Staging Areas	5	1	6
Intermountain Water Supply Subtotal	**141.7**	**99.2**	**240.9**
ALTERNATIVE A			
Fish Springs Ranch Pipeline Corridor	210.8	169.9	**380.7**
Intermountain Water Supply Pipeline Corridor	127.5	99.2	**226.7**

Source: Intermountain Water Supply 2005; Fish Springs Ranch 2004.

SURFACE DISTURBANCE

Surface disturbance that would occur for each proposed Project component and ownership are presented in **Table 2-1**.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

This section describes alternatives to the Proposed Actions that were eliminated from further review in the EIS. These alternatives were identified during the public scoping and comment process or by BLM during review and analysis of the Proposed Actions. These alternatives were considered technically infeasible, provided no environmental advantage over the Proposed Actions, or would not meet the purpose and need of the Proposed Actions.

Alternative Pipeline Routes

This alternative would include all components of the Proposed Actions and would require that Fish Springs Ranch and Intermountain Water Supply construct their individual water pipelines across private land to delivery points in the Stead/Lemmon Valley Area. With the exception of a short segment of pipeline connecting well points in Bedell Flat to the Dry Valley well points, this alternative would eliminate construction of proposed pipelines across public land administered by BLM.

The pipeline routes included in this alternative would involve construction of pipelines from the Dry Valley wells and Honey Lake well array onto private land. These alternative pipeline routes are shown on **Figure 2-8** and described below:

Fish Springs Ranch – East Honey Lake

The pipeline would connect the array of production wells at Fish Springs Ranch and would travel northward approximately 2 miles; the route would turn southwestward where it would intersect the northern end of Long Valley, California. The route would turn southeast and follow Long Valley and Long Valley Creek exiting the southern border of Lassen County, California and entering the northwest corner of Sierra County, California. The route would exit California heading northwesterly and connect to the proposed terminal tank included in Fish Springs Ranch's existing plan. Total distance of this pipeline route is approximately 62 miles. The pipeline route would cross private land and land administered by the State of California.

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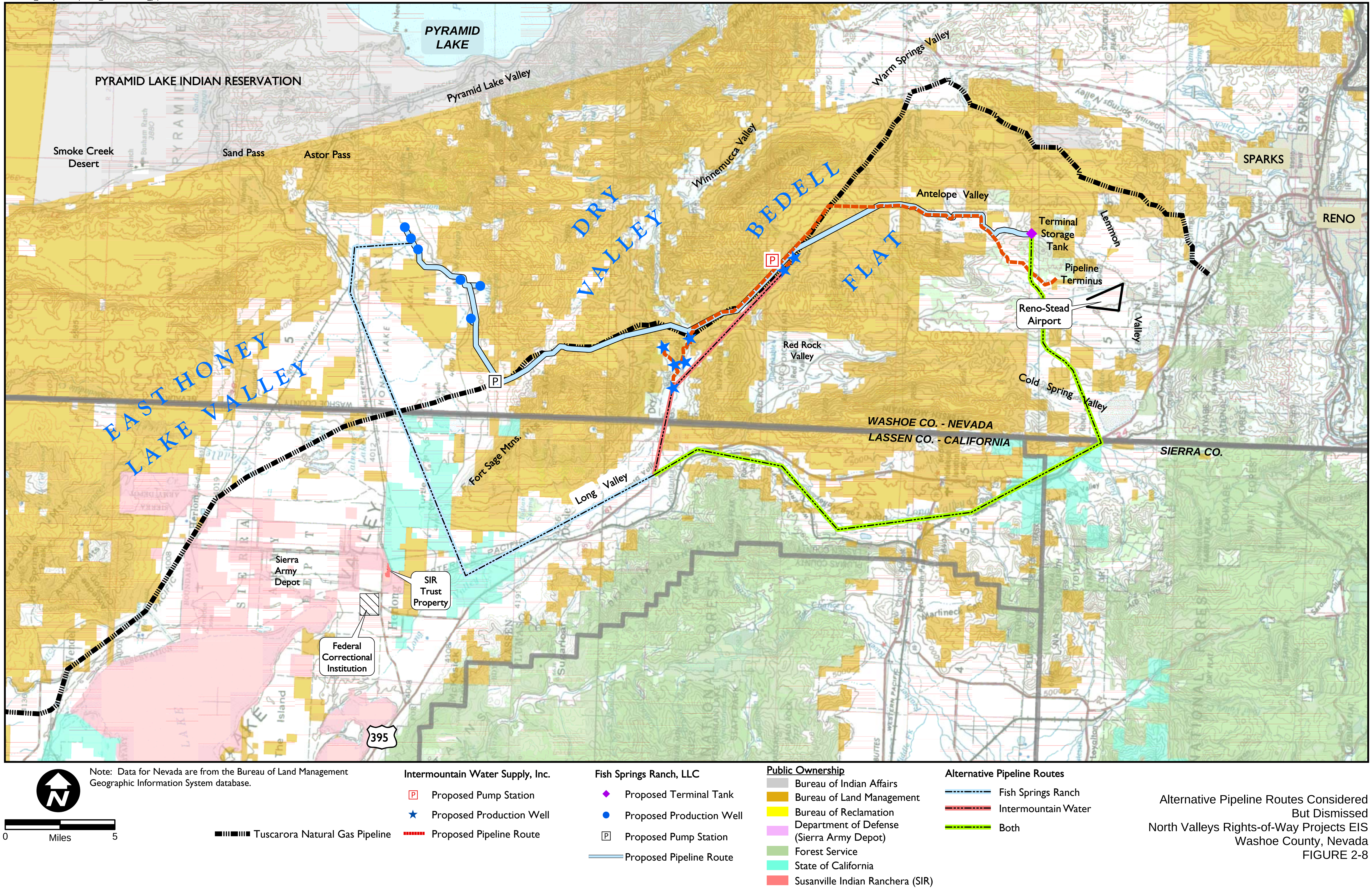

Alternative Pipeline Routes Considered But Dismissed
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 2-8

Intermountain Water Supply – Dry Valley and Bedell Flat

The pipeline would connect the well point in Bedell Flat to the well points in Dry Valley. The pipeline connecting Bedell Flat would cross approximately 5 miles of public land (administered by BLM) and 2 miles of private land. The pipeline route would exit from the Dry Valley well array to the west to a point where it intersects a point in Long Valley, California where it would join the previously described pipeline route for Fish Springs Ranch. Total estimated route length for the Intermountain Water Supply pipeline in this alternative is approximately 44 miles; all but 5 miles on private land or land administered by the State of California.

With the exception of groundwater production from the Bedell Flat wells, this alternative would eliminate the need for a right-of-way across public land administered by BLM. A right-of-way would be required across public land for the 5-mile segment connecting Bedell Flat wells to the Dry Valley pipeline system.

Rationale for Dismissing

This alternative was eliminated from further analysis in the EIS because it provides no advantage over the Proposed Action and would result in the need to construct approximately 36 additional miles of pipeline corridor as compared to the Proposed Action. In addition, production from the Bedell Flat well system would still require authorization of a right-of-way from BLM to allow water to be transported from this basin to the North Valleys Planning Area.

Construct Project Using a Single Pipeline and Fish Springs Ranch Terminal Storage Tank

Under the Proposed Actions, two pipelines generally would be constructed parallel with one another from the point of intersection in Dry Valley to two separate terminal areas (2 miles in Dry Valley, 6 miles in Bedell Flat, and 5 miles in Antelope Valley) (**Figure 2-1**). Approximately 8 miles of this shared pipeline corridor would be constructed within the Tuscarora Gas Pipeline right-of-way in Dry Valley and Bedell Flat.

This alternative incorporates all components of the Proposed Actions, but would result in construction and installation of a single pipeline from the point of intersection of the Intermountain Water Supply pipeline and Fish Springs Ranch pipeline in Dry Valley to the Fish Springs Ranch pipeline terminal storage tank site on the divide between Antelope Valley and Lemmon Valley. The pipeline would be sized to deliver up to 10,500 af/yr. Construction of a single pipeline would result in less surface disturbance and potential re-disturbance of reclaimed portions of the shared right-of-way. Installation of a single pipeline would reduce the amount of construction and pipeline materials required. Potential construction conflicts would be avoided allowing timely completion of the project with minimal disruption to local traffic. A common storage tank terminus would further reduce overall surface disturbance and potential visual effects.

Particulate and gaseous emissions and noise generated during construction would be reduced. Additional construction jobs and resultant taxes would not be realized. Estimated cost to construct and reclaim approximately 20 miles of pipeline ranges from $5 to $5.5 million.

Although technically feasible, this alternative would require cooperation and agreement between Intermountain Water Supply and Fish Springs Ranch. BLM does not have authority to require the respective proponents to enter into such an agreement and, therefore, this alternative has been eliminated from further consideration.

Reroute Pipeline Right-of-Way through Antelope Valley

This alternative would require relocation of the pipelines approximately 1 mile east or west of the proposed route through Antelope Valley onto other private and public land. The western route would begin in the SE¼ of Section 11, Township 22 North, Range 19 East on Antelope Valley Road and proceed west approximately 1 mile, then south approximately 3 miles along the western part of Antelope Valley on public land administered by BLM to the point of intersection with the proposed route. The east route would begin in the SW¼ of Section 1, Township 22 North, Range 19 East, and proceed 5 miles south along the eastern portion of Antelope Valley through public and private land, then west for approximately 1.5 miles to rejoin the proposed route. These alternatives provided no environmental advantage over the Proposed Actions, which uses an existing county road right-of-way through Antelope Valley.

AGENCY PREFERRED ALTERNATIVE

The Agency preferred alternative is:

Alternative A – Construct Pipelines within Common Right-of-Way.

CHAPTER 3

AFFECTED ENVIRONMENT FOR PROPOSED ACTIONS AND ALTERNATIVES

INTRODUCTION

The North Valleys Rights-of-Way Projects consists of two water transmission pipeline projects: 1) Fish Springs Ranch project to pump water from six wells at Fish Springs Ranch in eastern Honey Lake Valley in a pipeline extending 38 miles to a terminal storage tank located between Antelope Valley and Lemmon Valley; and 2) Intermountain Water Supply proposal to pump water from five wells in Dry Valley and two wells in Bedell Flat in a 24-mile long pipeline to the terminus near Reno-Stead Airport in Lemmon Valley. Both project terminus sites are located approximately 15 miles north of Reno, Nevada (**Figure 3-1**).

The proposed Fish Springs Ranch pipeline right-of-way lies adjacent to the Tuscarora Gas Pipeline right-of-way southward from the pump station along the north flank of Fort Sage Mountains in eastern Honey Lake Valley, then into Dry Valley and Bedell Flat. In Bedell Flat, the Fish Springs Ranch pipeline corridor veers south away from the Tuscarora right-of-way into Antelope Valley and to a terminal storage tank between Antelope Valley and Lemmon Valley. The Intermountain Water Supply pipeline parallels the Fish Springs Ranch pipeline across portions of Dry Valley, Bedell Flat, and Antelope Valley before diverging south into Lemmon Valley to the pipeline terminus. The proposed pipeline corridors would cross public land administered by BLM. A detailed description of the Proposed Projects is in Chapter 2 of this Draft EIS.

This chapter provides a summary of environmental baseline information. In the following sections, "Projects Area" refers to the proposed pipeline rights-of-way (Proposed Actions) and associated components shown on **Figure 3-1**. The "Study Area" is synonymous with Projects Area for some resources (soil and non-wetland vegetation), but is larger for most resources. The "area of potential effect" as used in the *Cultural Resources* section is synonymous with Projects Area. Study Areas for each environmental resource are based on predicted locations of direct and indirect impacts from the Proposed Actions and Alternatives.

Appendix 5 of BLM's NEPA Handbook (H-1740-1) identifies Critical Elements of the Human Environment. The appendix is a list of elements of the human environment that are subject to requirements specified in statutes or executive orders and must be considered in all BLM environmental documents. The Critical Elements are:

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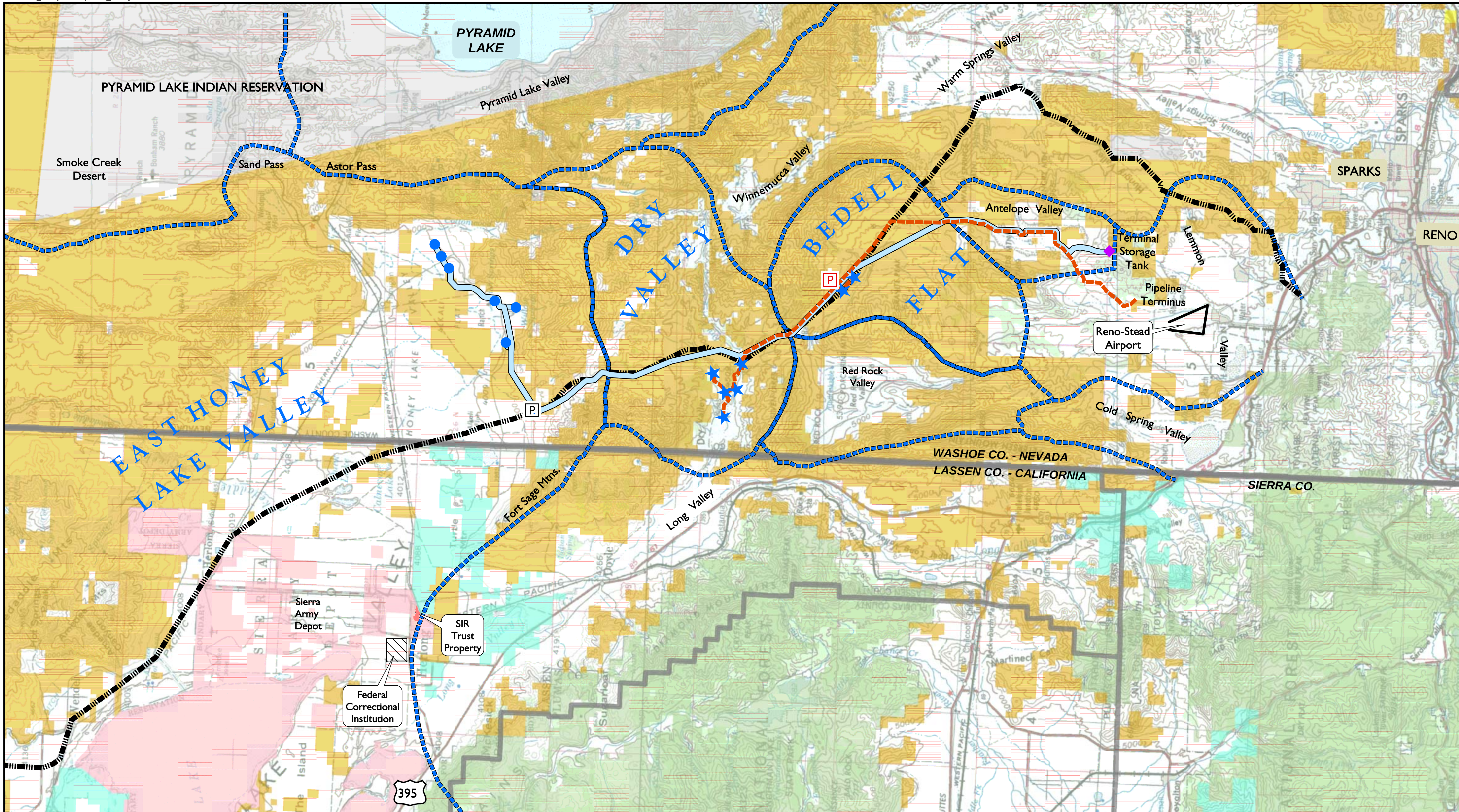


Note: Data for Nevada are from the Bureau of Land Management Geographic Information System database.

N

0 Miles 5

Intermountain Water Supply, Inc.
- Proposed Pump Station
- Proposed Production Well
- Proposed Pipeline Route

Fish Springs Ranch, LLC
- Proposed Terminal Tank
- Proposed Production Well
- Proposed Pump Station
- Proposed Pipeline Route

Public Ownership
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Department of Defense (Sierra Army Depot)
- Forest Service
- State of California
- Susanville Indian Ranchera (SIR)

- Tuscarora Natural Gas Pipeline
- Watershed Boundary

Projects Area
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 3-1

- Air Quality
- Areas of Critical Environmental Concern (ACEC)
- Cultural Resources
- Environmental Justice
- Farm Land (prime or unique)
- Floodplains
- Invasive, Non-native Species
- Native American Religious Concerns
- Threatened, Endangered, Candidate, and Special Status Species
- Migratory Birds
- Water Quality (drinking water/groundwater)
- Wetlands/Riparian Zones
- Wild and Scenic River
- Wilderness

The following Critical Elements of the Human Environment have been analyzed by BLM and would not be affected by the Proposed Actions or Alternatives, or are not present in the Projects Area:

- Areas of Critical Environmental Concern
- Wastes (hazardous or solid)
- Floodplains
- Wild Horses and Burros
- Wild and Scenic Rivers
- Wilderness
- Farm Land (prime or unique)

GEOLOGY, MINERALS AND PALEONTOLOGY

PHYSIOGRAPHIC LOCATION

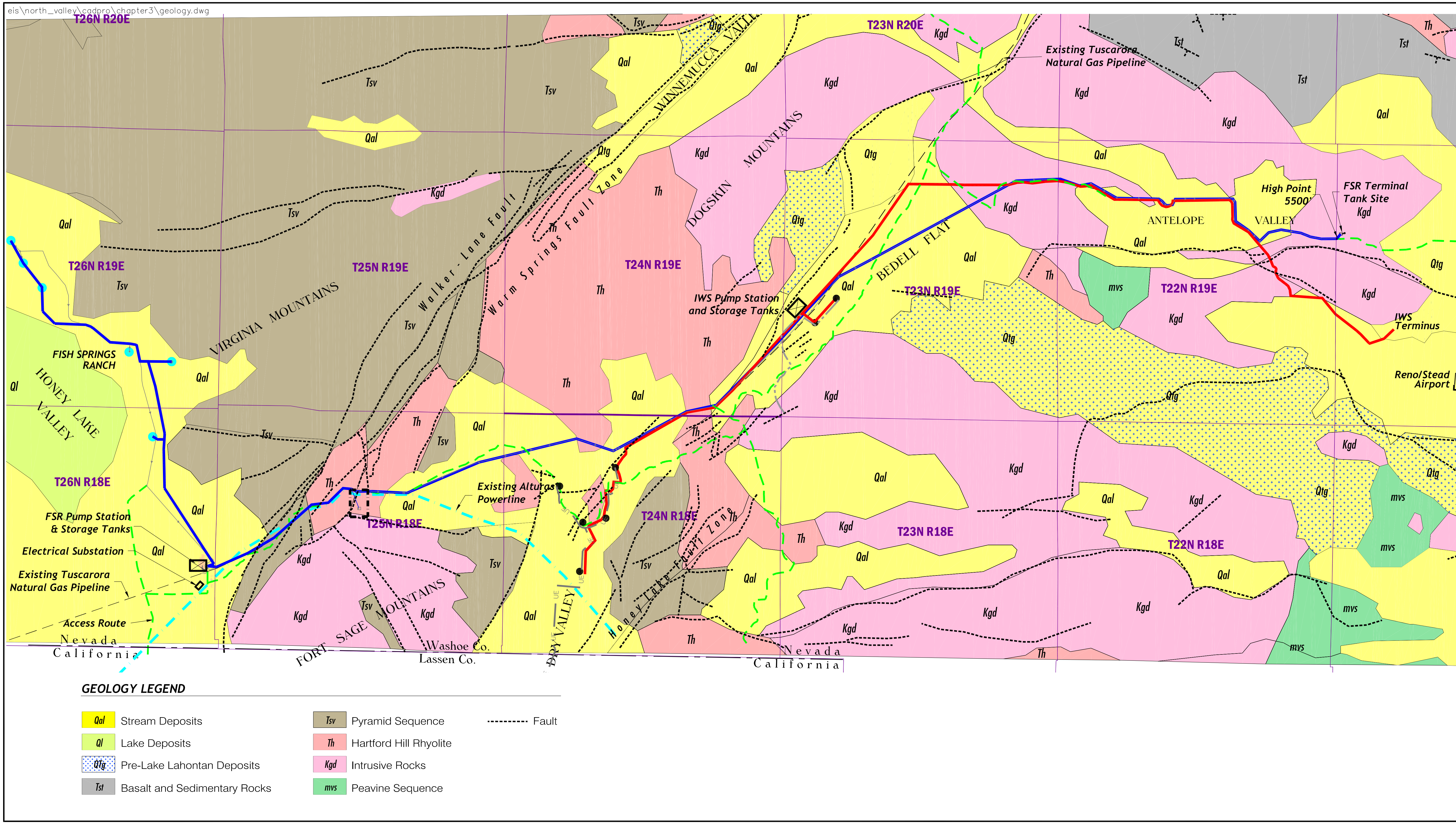
The Projects Area is located within the Basin and Range Physiographic Province, which contains elongate north and northwest trending mountain ranges of moderate to high relief (elevation 6000 to 8000 feet above mean sea level (amsl)) that alternate with, and are separated by colluvial and alluvial sediment filled basins (elevation 4000 to 6000 feet amsl). Many basins in the area contain playa lakes including Honey Lake at the north end of the proposed Fish Springs Ranch water pipeline (**Figure 3-1**). Playa lakes are generally located in central portions of closed basins in arid and semi-arid environments, whose water levels vary considerably as a function of precipitation and evaporation. The basins may contain areas of evaporite (alkali-salts) sedimentary deposits deposited on flat lacustrine valley floors.

GEOLOGY

Geologically young rocks of Tertiary age (65 to 1.8 million years ago) and Quaternary age (1.8 million to 8,000 years ago) outcrop across most of the Study Area in southern Washoe County (**Figure 3-2**). Tertiary rock units are comprised predominantly of volcanic rocks that occur as interbedded lava flows, ash flows, ash falls, and pyroclastic rocks that range from basaltic to rhyolitic. Locally, sedimentary rocks are interlayered with volcanics. Volcanic units include the Hartford Hill Rhyolite, Alta Formation, and Pyramid sequence (Bonham 1969). Brief descriptions of these geologic units are presented in **Table 3-1**. Quaternary units are predominantly poorly consolidated to unconsolidated alluvial, colluvial, and lacustrine (lake bed) sediment. In the vicinity of the proposed pipelines, these units include pre-Lahontan deposits of sand and gravel deposited as alluvial fans, terraces, and pediments; and younger Quaternary alluvium and colluvium deposits (Bonham 1969). Over 1,000 feet of sediment fill many valleys in the Study Area.

In southern Washoe County, pre-Tertiary rocks of Triassic and Jurassic age (248 to 145 million years ago) consist predominantly of metamorphosed (thermally altered) volcanic rocks of the Peavine Sequence (Bonham 1969). Younger Cretaceous age granitic stocks (biotite-hornblende granodiorite) intrude these metamorphic rocks and have been dated at 92 to 88 million years ago.

Structural geology of the area indicates two principal periods of deformation: one of Jurassic age, and the other of Miocene to recent age (Bonham 1969). The Jurassic age event (213 to 145 million years ago) consisted of folding, faulting, and low-grade thermal metamorphism of Triassic and Jurassic age volcanic and sedimentary rocks. Emplacement of numerous Cretaceous age granitic and granodioritic intrusive bodies followed these deformational events and resulted in contact thermal metamorphic haloes around intrusive stocks and plutons.



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Not to Scale

MAP LEGEND

IWS	INTERMOUNTAIN WATER SUPPLY		PROPOSED IWS WATERLINE
FSR	FISH SPRINGS RANCH		PROPOSED FSR WATERLINE
	PROPOSED ACCESS ROUTES		PROPOSED UNDERGROUND ELECTRIC
	TUSCARORA NATURAL GAS PIPELINE		PROPOSED ABOVEGROUND ELECTRIC
	ALTURAS POWERLINE		PROPOSED IWS WELL
	TOWNSHIP AND RANGE		PROPOSED FSR WELL

Geologic Map
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 3-2

The second major deformational event began in the Miocene age (23.8 million years ago), and waning phases of this orogenic (mountain building) event continue today. This deformation includes the normal faulting (up and down movement along steeply dipping fault planes), and wrench-faulting (also called strike-slip faulting, with principally lateral movement along steeply dipping faults) responsible for the uplift, tilting, and folding of sedimentary rock units of the existing mountain ranges and volcanism associated with the mountain building event. The Walker-Lane fault or shear zone is a major strike-slip fault structure that trends northwest to southeast in the southern third of Washoe County. The amount of right lateral offset on this fault appears to be on the order of 80 to 120 miles (Bonham 1969). The Walker-Lane fault extends from the southern edge of Honey Lake Basin southeast between the Fort Sage and Virginia Mountains and continuing southeast through the Winnemucca and Warm Springs Valleys about 6 miles northeast of the proposed pipeline in the Bedell Flat area (**Figure 3-2**).

There is evidence to suggest that Bedell Flat and the area southwest of Dogskin Mountain lie on a system of faults parallel to and within a zone that may be part of the overall Walker-Lane fault system or shear zone. Subsequent vertical displacement along range bounding faults along the west side of the Virginia Mountains indicates that Mesozoic basement rock is depressed by some 4,000 feet below that of adjacent ranges to the west across the Walker-Lane fault (Gimlett 1967). In addition, depth of valley fill in Warm Springs Valley ranges from 1920 to 3380 feet amsl (Gimlett 1967).

TABLE 3-1
Simplified Stratigraphic Section of North Valleys Projects Area

System	Million Years Ago	Formation	Description[1]
Quaternary	1.8 to present	Quaternary Alluvium (Qal)[2]	Stream deposits, talus and slope wash alluvial and colluvial deposits
Pleistocene	1.8 million to 8000 years	Pre-Lake Lahontan Deposits (QTg)[2]	Terrace, alluvial fan and pediment gravels
Pliocene	5.3 to 1.8	Pliocene Sedimentary Rock (Tst)[2]	Fluvial and lacustrine sedimentary rock, arkose, sandstone, siltstone, mudstone and shale.
Miocene	23.8 to 5.3	Pyramid Sequence (Tsv)[2]	Volcanic basalt, andesite flows, breccias and agglomerates, minor sedimentary rocks
Miocene	23.8 to 5.3	Alta Formation (Ta)[2]	Predominantly andesitic volcanic flows, breccias and pyroclastic rocks with minor sedimentary phases
Oligocene	33.7 to 23.8	Hartford Hill Rhyolite (Th)[2]	Predominantly volcanic ash flow tuff, with minor ash fall tuff and clastic sedimentary rocks
Erosional Unconformity			
Cretaceous	145 to 65	Intrusive Rocks (Kgd)[2]	Undifferentiated intrusive rock ranging from gabbro to granite in composition, with quartz monzonites being most common
Triassic/ Jurassic	145 to 248	Peavine Sequence, Metavolcanic Member (mv)[2]	Thermally metamorphosed volcanic rock consisting of flows, and pyroclastic rocks ranging in composition from basaltic to rhyolitic

1 Rock descriptions modified from Bonham (1969).
2 Geologic map symbol.

AREA SEISMICITY

Southern Washoe County occurs within the Sierra Nevada-Great Basin Seismic Belt and contains earthquakes that occur along the eastern side of the Sierra Nevada. This belt is characterized by "persistently high levels of earthquake activity" (dePollo and dePollo 1999). The Uniform Building Code considers this area in Seismic Risk Zone 4 for construction purposes (UBC 2000).

The U.S. Geological Survey's (USGS) Seismic Hazards Database tabulates historical records of earthquakes from about 1850 to present (USGS 2004a). Records of earthquakes occurring after 1973 typically identify the magnitude and epicenter of the earthquake from measurements observed from a network of seismic stations. Earthquakes before that time may have been identified by a number of various methods including observations of the earthquakes effects. In either case, the overall historical earthquake record (150 years) is too short to be an effective indictor of past or future earthquake activity.

Searches conducted on the USGS database for earthquakes occurring within 200 kilometers (km) of the center of the proposed pipelines identified 345 earthquakes of a magnitude greater than 3.5 since 1973. In addition, these records identify 119 earthquakes of a magnitude greater than 5.0 (modified Richter scale), including 18 earthquakes greater than 6.0, and 2 earthquakes greater than 7.0 since 1850. The largest earthquake recorded in this area was magnitude 7.26 in 1954 located 169 km east of the Projects Area, southwest of Pyramid Lake and the town of Nixon, Nevada.

The USGS also has a Quaternary Fault Database system (USGS 2004b) that tabulates and describes fault systems with active movement within the Quaternary Period (1.8 million years ago to present). These faults have been identified based on field evidence (i.e., fault scarps; geomorphic evidence of Holocene displacement; offset of Pleistocene shoreline and alluvial fan features, lineaments). Three fault systems within the Study Area are recognized as having had movement in the Quaternary period and lie in close proximity to, or along, the proposed pipeline rights-of-way:

1) Honey Lake fault zone, which exhibits right lateral strike-slip, range front faults bounding the southwestern flank of Dogskin Mountains and Fort Sage Mountains, through the Seven Lakes Mountains, and inter-basinal faults in the Bedell Flat and Dry Valley areas.

2) Warm Springs Valley fault zone exhibits as much as 5.5 km of right lateral offset of geologic unit on either side of the Warm Springs Valley and interbasinal faults within the valley.

3) Fred Mountain Fault system has range front faults on the east side of Freds Mountain and an unnamed mountain block to the south (near southern terminus of proposed water transmission pipeline corridors).

The 1994 EIS (FERC/CSLC 1994) for the Tuscarora Gas Pipeline (which runs adjacent to the proposed pipeline rights-of-way over part of its length) identified two fault systems in southern Honey Lake Valley (Honey Lake and Fort Sage Mountain fault zones). Estimated maxim credible earthquake potential and acceleration from these fault zones are 7.3 and 0.36g, and 6.0 and 0.31g, respectively.

PALEONTOLOGICAL RESOURCES

The large intrusive and volcanic component of lithologies in southern Washoe County to a large extent precludes the presence of fossils. However, a few sparse fossils have been found within scattered sedimentary interbeds within volcanic sequences and in metamorphosed basement rock. Significant fossil resources are generally considered to be vertebrate fossils. No significant paleontological resources have been identified within the Study Area.

An ammonite has been found in sedimentary rocks associated with metamorphosed Triassic basement rock (Bonham 1969). In addition, sedimentary units of the Alta Formation and Pyramid Sequence locally contain flora of Miocene and Miocene/Pliocene ages, respectively.

Exposures in Mesozoic and Cenozoic stratigraphic units and paleontological resources identified to date from strata of southern Washoe County are similar to those found commonly elsewhere in Nevada and are not considered unusual or unique. In addition, most construction of the water transmission pipelines would occur within recent valley fill sediments.

AIR RESOURCES

SITE CLIMATOLOGY

Climatology of the Study Area (entire area depicted on **Figure 3-1**) is represented by meteorological and precipitation data collected at the Reno-Tahoe International Airport. The National Climatic Data Center (NCDC), previously the National Weather Service, has collected meteorological data at the Reno airport since 1937. Temperatures at the Reno-Tahoe airport are warmest in July and August and coolest in December and January.

Mean annual precipitation at Reno during the period of record was 7.48 inches. Precipitation is highest in January and February and lowest from March to October. **Table 3-2** is a summary of temperature and precipitation data for the period of record from 1971 to 2000.

In addition to temperature and precipitation, NCDC collects wind speed and direction data at the Reno airport. Wind patterns in the Study Area are predominately from the west, with some easterly influence as well.

AIR QUALITY

The State of Nevada and federal government have established ambient air quality standards for criteria air pollutants. The criteria pollutants are carbon monoxide (CO), lead (Pb), sulfur dioxide (SO_2), particulate matter smaller than 10 microns (PM_{10}), ozone (O_3), and nitrogen dioxide (NO_2). National Ambient Air Quality Standards (NAAQS) have also been adopted for particulate matter smaller than 2.5 microns ($PM_{2.5}$)

TABLE 3-2
Temperature and Precipitation Data from Reno-Tahoe International Airport
1971 – 2000

Parameter	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Annual Avg.
Temperature (degrees F)													
Average Maximum	45.5	51.7	57.2	64.1	72.6	82.5	91.2	89.9	81.7	69.9	55.3	46.4	67.4
Average Minimum	25.7	30.8	38.3	40.2	48.7	59.8	67.1	62.5	56.3	46.5	35.1	25.4	25.4
Total Precipitation (inches)													
Mean Monthly Precipitation	1.06	1.06	0.86	0.35	0.62	0.47	0.24	0.27	0.45	0.42	0.80	0.88	7.48
Highest Monthly Precipitation	3.32	4.84	2.87	1.35	2.38	1.53	1.06	1.03	2.31	1.65	3.08	3.03	---
Year Highest Monthly Precipitation Occurred	1997	1986	1995	1983	1971	1989	1971	1975	1982	1982	1983	1996	---
Lowest Monthly Precipitation	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	---
Year Lowest Monthly Precipitation Occurred	1991	1988	1988	1985	1985	1994	2000	1998	1995	1995	1999	1989	---

Source: Western Regional Climatic Center 2004.

Ambient air quality standards must not be exceeded in areas where the general public has access. National primary standards are the levels of air quality necessary, with an adequate margin of safety, to protect the public health. National secondary standards are the levels of air quality necessary to protect the public welfare from known or anticipated adverse effects of a regulated air pollutant.

The 1- and 8-hour CO standards and the 3- and 24-hour SO_2 standards must not be exceeded more than once per year. The PM_{10} 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above the standard, rounded to the nearest 10 micrograms per cubic meter ($\mu g/m^3$), is equal to or less than 1 day (NAC 445B.22097). Monitored or expected annual average levels of PM_{10}, NO_2, and SO_2 must not be exceeded in any year. Compliance with the 8-hour ozone and $PM_{2.5}$ standards is based on 3-year averages, as explained in EPA regulations. The 1-hour ozone NAAQS will no longer apply to an area one year after the effective date of designation of that area for the 8-hour ozone NAAQS. The effective designation date for most areas is June 15, 2004 (EPA 2004).

Attainment status within the Study Area is determined by monitoring ambient levels of criteria pollutants. Air quality in most of Washoe County is classified as attainment or unclassified for all pollutants. The attainment or unclassified designation means that no violations of Nevada or national air quality standards have been documented in the region.

Washoe County is designated as non-attainment area for CO. Portions of Washoe County are designated as non-attainment areas for ozone (1-hour standard) and PM_{10}. This designation means that exceedances of the applicable ambient air quality standards have been measured in the area.

PSD CLASSIFICATION

The area surrounding the Projects Area is a designated Class II area as defined by the Federal Prevention of Significant Deterioration (PSD) of Air Quality program. The PSD Class II designation allows for moderate growth or degradation of air quality within certain limits above baseline air quality. Industrial sources proposing construction or modifications must demonstrate that proposed emissions would not cause significant deterioration of air quality in all areas.

Standards for significant deterioration are more stringent for Class I areas than Class II areas. The Class I area nearest to the proposed Projects is the U.S. Forest Service Desolation Wilderness Areas in California. Desolation Wilderness Area is located approximately 50 miles southwest of the Projects Area. Air quality related values are protected in Class I areas as well as ambient air quality.

EXISTING EMISSION SOURCES

Existing sources of emission within the Projects Area include diesel-generator sets used to pump water from wells associated with Fish Spring Ranch's irrigation system and supply general ranch operations. Five diesel engine driven pumps are used to pump water from irrigation wells and two ranch generators are used to supply electrical power for general ranch operations. Diesel engine powered generators used to pump well water range from 230 to 450 hp and the general ranch diesel-generators are 100 hp each. Diesel-generator sets associated with irrigation wells are operated seasonally during the irrigation season. Estimated NOx (oxides of nitrogen) emissions from these diesel-powered generator sets range from 17 to 304 pounds per day (lbs/day), totaling nearly 1,000 lbs/day during the irrigation season. General ranch generator emissions are estimated at 42 lbs/day NOx, for a combined emission of approximately 84 lbs/day.

WATER RESOURCES

This section describes surface water and groundwater resources in the Study Area which consists of the eastern Honey Lake Valley, Dry Valley, and Bedell Flat watersheds, and portions of Antelope Valley, Lemmon Valley, Smoke Creek Desert, and Pyramid Lake Valley (**Figure 3-1**). The proposed pumping wells would be located in eastern Honey Lake Valley for Fish Springs Ranch, and west-central Dry Valley and northwestern Bedell Flat for Intermountain Water Supply. The water transmission pipelines would extend south from these valleys into portions of Antelope Valley and Lemmon Valley. Part of Honey Lake Valley and Dry Valley extend west into California. Pyramid Lake is located 5 to 10 miles east of the Projects Area in Nevada.

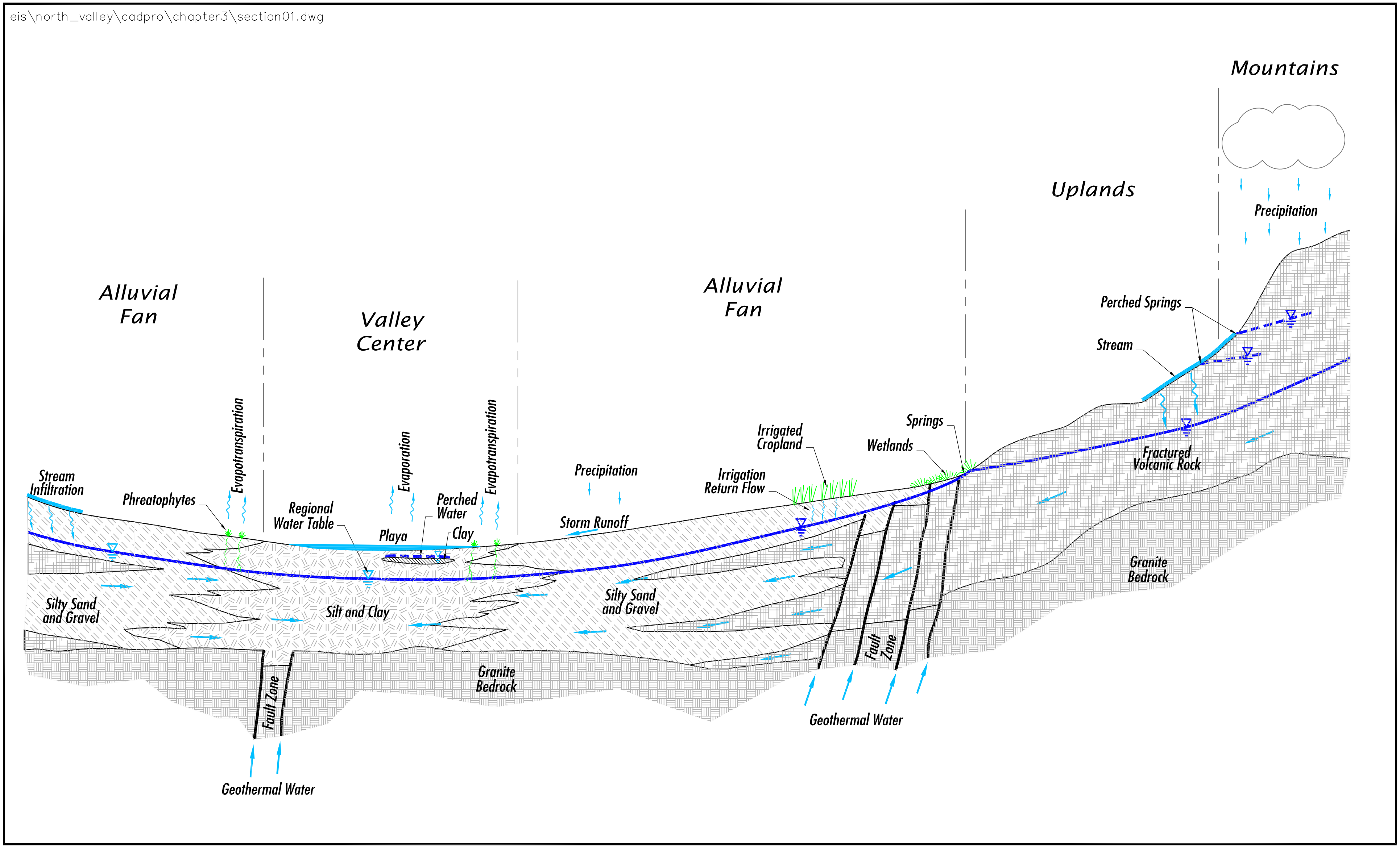
The Study Area is characterized by fault-block mountain ranges separated by broad basins filled with sediment. **Figure 3-3** is a generalized cross-section showing features of a typical basin and range hydrologic system. The mountains are composed primarily of granite and overlying volcanic rocks. The granite is relatively impermeable to groundwater movement, while many of the volcanic rocks are fractured and have greater capacity to transmit groundwater in secondary openings.

- **Honey Lake Valley** – Hydrographic area no. 97 totals 123,520 acres (193 square miles (mi^2)) within Nevada. An additional 2,000 mi^2 of Honey Lake Valley extends into eastern California. Honey Lake Valley is a closed basin, with Honey Lake as the primary playa water body. The surface area of Honey Lake, located entirely in California, fluctuates seasonally and has been observed dry several times (Rockwell 1990). On average, however, Honey Lake covers an area of 47,000 acres with a volume of 120,000 acre-feet (Handman *et al.* 1990). Most surface water that drains from mountains in the eastern side of Honey Lake Valley infiltrates into alluvial fan and valley fill sediments near the basin edges. Fish Springs playa in Alkali Flats is located near the proposed pumping wells for Fish Springs Ranch in southeastern Honey Lake Valley.

- **Dry Valley** – Hydrographic area no. 95 totals 51,200 acres (80 mi^2) in Nevada. For purposes of this project, Newcomb Lake Valley (hydrographic area no. 96 totaling 5,760 acres or 9 mi^2) is considered part of the Dry Valley hydrographic area. Dry Valley Creek drains west through Nevada to Long Valley in California, which then drains to Honey Lake Valley. The western-most side of Dry Valley (approximately 3 mi^2) is in California. Dry Valley Creek is ephemeral, flowing primarily in response to snowmelt runoff and major rain events. Some of the tributary channels of Dry Valley Creek have perennial reaches where springs provide sources of year-round water. Dry Valley Creek west of the state line also becomes perennial prior to reaching Long Valley Creek, which is located approximately 4 miles west of the state line.

- **Bedell Flat** – Hydrographic area no. 94 totals 33,920 acres (53 mi^2) in Nevada. Bedell Flat is situated north of Antelope and Lemmon Valleys and east of Red Rock Valley. A minor ephemeral drainage is located in the center of the basin, exiting in the northwest corner to Red Rock Valley. No perennial streams exist in the basin, and there is no playa in the valley floor.

The three watersheds listed above would be subject to groundwater pumping as part of the Proposed Actions. The proposed water pipelines would extend north-south through these three watersheds, as well as two other hydrographic areas (Antelope and Lemmon Valleys) contained within the Western Hydrographic Basin:



Not to Scale

Direction of Water Movement

Groundwater Surface

Generalized Hydrogeologic Cross Section
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 3-3

- **Antelope Valley** – Hydrographic area no. 93 totals 11,520 acres (18 mi^2) in Nevada. Antelope Valley is a closed basin. No perennial surface water flow occurs in Antelope Valley, except for short reaches near a few small springs that discharge year-round.

- **Lemmon Valley** (eastern part) – Hydrographic area no. 92B totals 25,600 acres (40 mi^2) in Nevada. Lemmon Valley is a closed basin with runoff terminating at the Lemmon and Silver Lake playas. The northern part of Lemmon Valley is where the pipeline terminus and storage tank(s) would be located. No perennial surface water occurs in this area.

The Western Hydrographic Region of Nevada covers 385,280 acres (602 mi^2) and is contained in Washoe County. Surface water in this region generally drains west through western Nevada into eastern California, or drains internally into closed basins. A large portion of Honey Lake Valley is located in California, and a small part of Dry Valley extends into California. The other hydrographic areas (Bedell Flat, Antelope Valley, and Lemmon Valley) are located entirely within Nevada. Most surface water from the Western Hydrographic Region has potential to flow into Honey Lake, a closed-basin playa in the California side of Honey Lake Valley.

In general, perennial reaches of some streams (e.g., Cottonwood Creek located about 3 miles east of Fish Springs Ranch headquarters, and Fish Springs Creek located about 4 miles west of Fish Springs Ranch headquarters) are located in the mountainous areas where discharge from springs provides year-round water. Other stream reaches flow only in response to runoff from snowmelt and high-intensity rain storms. In general, stream flow: 1) is subject to evapotranspiration along the channels; 2) reaches a playa in the valley floor; and/or 3) percolates to become groundwater recharge. Most surface water that drains from surrounding mountains evapotranspirates or infiltrates prior to reaching valley floors.

Mean annual stream flow for Cottonwood Creek is estimated at 2.2 cubic feet per second (ft^3/sec) or 1,000 gallons per minute (gal/min) for a drainage area of 14.6 mi^2 (Rockwell 1990). For Fish Springs Creek, mean annual flow is about 0.43 ft^3/sec (200 gal/min) for a drainage area of 3.7 mi^2 (Rockwell 1990).

Stream flow observations and measurements collected by the USGS (Berger *et al.* 2004) from Dry Valley Creek about 1 mile west of the state line show that flow began near the end of October 2002 and ceased by early May 2003. During this period, average flow rate was less than 0.5 ft^3/sec (225 gal/min) (Berger *et al.* 2004).

SURFACE WATER QUALITY

Quality of surface water has been characterized by a limited number of samples collected from stream segments in the Study Area. Salinity and alkalinity of surface water generally are low to moderate, Cottonwood Creek and Fish Springs Creek in southeastern Honey Lake Valley show these streams to be calcium-bicarbonate type with total dissolved solids (TDS) concentrations of 147 and 169 milligrams per liter (mg/L) (Rockwell 1990).

According to Handman *et al.* (1990), calcium, sodium, and bicarbonate are the predominant ions in streams in eastern Honey Lake Valley. In the central part of the basin, sodium, chloride, and TDS are higher.

A water sample collected from lower Dry Valley Creek in April 2000 shows a TDS of 322 mg/L and pH of 8.9 standard units (Stantec Consulting and Cordilleran Hydrology 2000). The water is a sodium-calcium bicarbonate type, with low concentrations of other ions and metals.

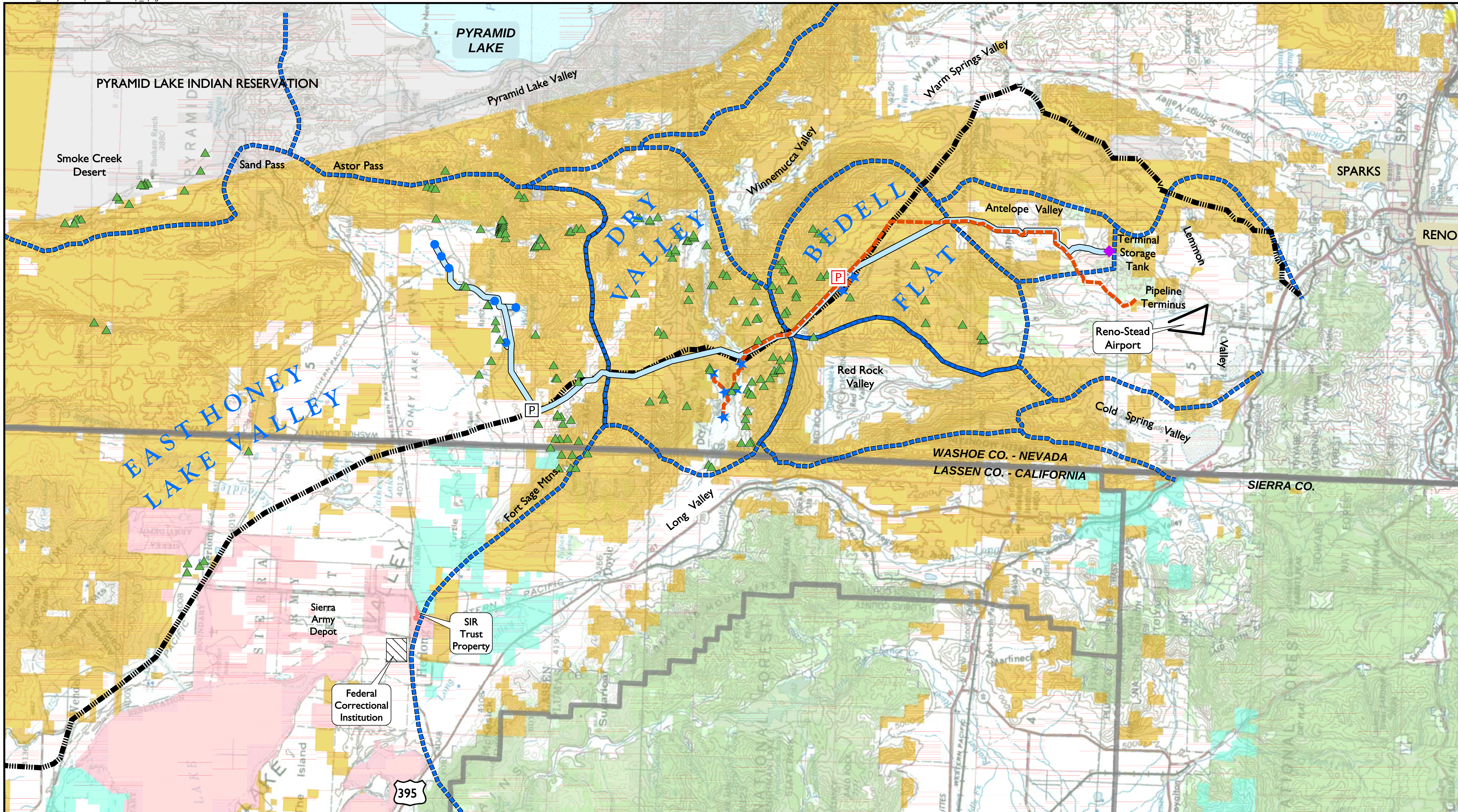
SPRINGS

Numerous springs have been identified in the Study Area. In 1989 and 1990, JBR Consultants Group (1990a, 1990b) conducted spring and seep inventories in Honey Lake Valley, Dry Valley, and the northern part of Bedell Flat. The inventories included information about flow rate, water quality (pH, conductivity, temperature), water usage, and geologic and vegetation characteristics. Results of these inventories are also summarized in the Draft EIS for Bedell Flat Pipeline Right-of-Way (BLM 1993). Another inventory of springs was completed by Westech Environmental Services (Westech 2004a) in summer 2004, focusing on the areas of potential groundwater drawdown that could result from proposed pumping in Honey Lake Valley, Dry Valley, and Bedell Flat. Springs in the Study Area, including flowing wells, identified from the 2004 inventory are shown on **Figure 3-4** and listed in **Table A-1** of **Appendix A**.

During the 1989 inventory by JBR (1990a), approximately 140 springs, seeps, and flowing wells were identified in the Study Area. For the 1990 inventory, JBR (1990b) identified an additional 23 springs and 18 flowing wells. Approximately 60 percent of the 1989 springs and 50 percent of the 1990 springs had flow rates of less than 1 gal/min. Only 17 springs inventoried in 1989, and four springs inventoried in 1990, had flows >5 gal/min, most of which were located in Cottonwood Creek drainage on the southeast side of Honey Lake Valley. Some of these springs discharge at rates of 30 to 40 gal/min. Inventoried wells were flowing at rates ranging from 1 to 145 gal/min (JBR 1990b).

Fish Springs was the primary source of water to Fish Springs Ranch prior to groundwater extraction via irrigation wells. The spring discharge upwelled through the bottom of a stone-line pond excavated at the spring site. According to Rush and Glancy (1967), the spring maintained a natural flow of about 1,600 gal/min prior to operation of the irrigation wells. The first irrigation well constructed in 1954 (Headquarters well) influenced flow from Fish Springs, but did not cause the spring to cease flowing. After the second irrigation well (Jarboe well) was constructed in 1984 and total irrigation pumping increased, Fish Springs did cease flowing completely in 1986 (William F. Guyton Associates 1986). Both

EIS\north_valley\arcmap\draft_eis\seep_sprgs.mxd



Note: Data for Nevada are from the Bureau of Land Management Geographic Information System database.

0 Miles 5

Intermountain Water Supply, Inc.
- Proposed Pump Station
- Proposed Production Well
- Proposed Pipeline Route

Fish Springs Ranch, LLC
- Proposed Terminal Tank
- Proposed Production Well
- Proposed Pump Station
- Proposed Pipeline Route

Public Ownership
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Department of Defense (Sierra Army Depot)
- Forest Service
- State of California
- Susanville Indian Ranchera (SIR)

- Tuscarora Natural Gas Pipeline
- Watershed Boundary
- Spring or Flowing Well in Vicinity of Proposed Pumping Wells

Springs and Flowing Wells
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 3-4

of these irrigation wells were completed in volcanic bedrock near Fish Springs and designed to intercept groundwater that was the source for Fish Springs.

High Rock Spring in northern Honey Lake Valley was discharging approximately 800 gal/min in 1989. According to the JBR (1990a), all springs with flows >5 gal/min discharged near basalt of the Pyramid Sequence.

In 2004, a total of 58 springs were identified by Westech (2004a) within the areas of potential groundwater drawdown resulting from the Proposed Actions. Of these springs, 29 are in Honey Lake Valley, 10 in Dry Valley, and 19 in Bedell Flat (**Figure 3-4**). Flowing wells were included in the spring inventory by Westech (2004a). No springs have been identified along the pipeline rights-of-way in Antelope and Lemmon valleys.

The extent that water flows downstream from each spring source and flowing well varies considerably. Many of the springs surface in the drainage bottom and flow only a short distance before infiltrating back into the ground. Other springs have flow that continues farther downstream and often combine with flow from other springs to form perennial reaches of stream flow. At some locations, heavy livestock use causes the water to spread over a relatively large area, thereby limiting downstream flow.

Most springs identified in the Study Area are located in upland areas where recharge occurs from direct precipitation (snow and rain) in the mountains. Where infiltrated water collects in shallow fracture zones and/or atop less permeable rock layers, discharge can occur as mountain springs (**Figure 3-3**). Some springs occur where the water table intercepts ground surface, often at a significant break in slope. Other springs discharge from deeper groundwater flow systems via major fracture/fault zones, some of which are geothermal (**Figure 3-3**). Little direct evidence of geologic structure could be discerned during the field surveys.

Quality of water for most springs in the Study Area was similar, especially those located in upland areas. Based on quality data collected during the 1989 JBR survey, electrical conductivity (EC) typically was in the range of 200 to 450 micromhos per centimeter (μmhos/cm), and pH values usually were from 7.0 to 7.9 standard units. Temperature for most springs varied from about 10 to 20 degrees Celsius (˚C); however, some springs were below 5 ˚C or above 25 ˚C. Some samples collected by JBR in 1989 were submitted for laboratory analysis of TDS, common ions, and iron. These data show that TDS is in the general range of 100 to 400 mg/L. Sodium and calcium are the dominant cations, and bicarbonate is the dominant anion. Chloride and sulfate concentrations are elevated for some springs (>100 mg/L). Iron concentrations are low for all spring samples.

According to BLM (1993), quality of springs discharging from volcanic tuffs is dominated by sodium cations, and those discharging from basalt primarily have calcium cations. Springs in Smoke Creek Desert (adjacent to northeast side of Honey Lake Valley) have the poorest water quality in the Study Area.

Analytical results for five springs in Dry Valley sampled by the USGS (Berger *et al.* 2004) in January and March 2003 show the following ranges: EC = 134 to 380 µmhos/cm; pH = 6.3 to 7.6 standard units; temperature = 7.2 to 13.0 °C; dissolved oxygen = 5.2 to 11.5 mg/L; alkalinity = 33 to 139 mg/L; sulfate = 4.5 to 29.4 mg/L; chloride = 3.1 to 23.1 mg/L; nitrate+nitrite = 0.3 to 1.79 mg/L; arsenic = 0.0016 to 0.0094 mg/L; and selenium = 0.0003 to 0.001 mg/L. Other metals also were analyzed by the USGS (Berger *et al.* 2004) with results showing low or non-detectable concentrations.

Several springs have been identified in the southwest end of Bedell Flat, including Whitney, Bird, and Juniper springs (InterFlow Hydrology and Cordilleran Hydrology 2003). On the southern flank of Dogskin Mountain in the northern part of Bedell Flat are several springs, including Bedell, Willow, Matley, and Settlemeyer. These springs produce small flows.

During the 1989 inventory, JBR Consultants (1990a) noted that approximately 45 percent of the springs had been developed by piping, damming, fencing, or other improvements. Most of the developed springs appeared to be for purposes of livestock watering. A large variety of plant and animal life near the springs also was observed by JBR Consultants (1990a).

GROUNDWATER QUANTITY

Groundwater is present in the Study Area in bedrock and valley-fill sediment. Relatively impermeable granitic bedrock forms a lower boundary to most groundwater flow within the Study Area. Volcanic rocks (e.g., basalt and andesite) comprise most of the mountain areas surrounding the valley floors, and have relatively high permeability where fractured. The valley-fill sediment consists of unconsolidated and semi-consolidated deposits having various mixtures of clay, silt, sand, and gravel. Poorly sorted alluvial fan material is located along the basin margins at the base of the mountain fronts, interfingering with dominantly fine-grained valley floor lake deposits. The alluvial fan sediment has moderate to high permeability. Semi-consolidated deposits in the valley floors are comprised of thick volcanic tuff and ash layers that were deposited in shallow lakes, along with lacustrine and fluvial clay, silt, and sand. Most of these valley-fill deposits have low permeability, with some coarser-grained zones having moderate permeability. See the "*Geology, Minerals and Paleontology*" section in this chapter for more information on geologic setting.

Most groundwater recharge occurs in the mountain areas surrounding valley floors where precipitation rates are higher and infiltration occurs directly into fractured bedrock (**Figure 3-3**). A portion of precipitation that falls on valley-fill sediment infiltrates into the unconsolidated material, recharging shallow groundwater in the sediments, and deeper groundwater in the underlying bedrock. Some of the snowmelt water and storm runoff in the mountains collects in drainage channels and flows down to alluvial fans along the margins of the valley floor where most of the surface water infiltrates and/or is subject to evapotranspiration.

HONEY LAKE VALLEY

Honey Lake Valley is a northwest-trending closed basin located on the western side of the Sierra Nevada Mountain Range about 35 miles north of Reno, Nevada. The basin covers an area of about 2,200 mi^2, most of which is located in California. Long Valley Creek and Susan River are the primary streams that drain into the center of the basin at Honey Lake. This shallow lake has no surface outflow and periodically becomes dry. The focus of the Fish Springs Ranch proposed Project is in eastern Honey Lake Valley where groundwater would be pumped from six wells at up to 8,000 acre-feet per year (af/yr).

Eastern Honey Lake Valley

Information about groundwater in eastern Honey Lake Valley is available from numerous studies that have been conducted in the study area. The 1993 Draft EIS for Bedell Flat Pipelines Rights-of-Way (BLM 1993) contains a summary of groundwater information collected for eastern Honey Lake Valley. Since that time, additional groundwater studies and monitoring have been completed using monitoring and irrigation wells in the valley.

Recharge/Discharge

Recharge to eastern Honey Lake Valley groundwater occurs from: 1) infiltration of direct precipitation and snowmelt into bedrock and valley-fill sediment; 2) infiltration of stream flow; 3) seepage from irrigation water; and 4) groundwater underflow from adjacent areas. Using a deep percolation model, Handman *et al.* (1990) estimated mean annual recharge to eastern Honey Lake Valley from precipitation as ranging from no recharge in the valley floors to 3 in/yr in the Virginia Mountains. Overall recharge from precipitation in eastern Honey Lake Valley is about 4,200 af/yr (Handman *et al.* 1990). Another recharge estimation method used by Handman *et al.* (1990) is based on a percentage of precipitation: 25 percent where precipitation is >20 inches; 15 percent in the 15-20 in/yr precipitation zone; 7 percent where precipitation is 12 to 15 in/yr; 3 percent in the 8 to 12 in/yr zone; and 0 percent where precipitation is <8 in/yr. Results of this recharge estimate are similar to deep percolation method results for the study area.

Infiltration of stream flow in eastern Honey Lake Valley occurs primarily in the alluvial fan areas where permeability of the sediment is moderate to high. In the eastern part of the valley, recharge from streams is estimated to be about 10,000 af/yr (Handman *et al.* 1990).

Water used for irrigation in eastern Honey Lake Valley has been primarily from several large production wells on Fish Springs Ranch. Because the infiltrated portion of this water is still part of groundwater withdrawal, it is accounted for in the discharge terms.

Approximately 5,600 af/yr was estimated by Handman *et al.* (1990) as groundwater underflow into eastern Honey Lake Valley, most of which occurs in the southeastern corner. Deep faults associated with the Walker Lane structure (e.g., Warm Springs fault) extend through this part of the Study Area. Source of geothermal water in eastern Honey Lake Valley likely is from groundwater flow within the basin (Handman *et al.* 1990). Isotope and chemical analysis of water samples from eastern Honey Lake Valley by Bohm (1990) indicates that groundwater from irrigation wells on the west side of Fish Springs Ranch is derived primarily from the Warm Springs fault zone; whereas, groundwater in the southern and eastern portions of the ranch are from shallow flow systems in the Virginia Mountains.

Direction of groundwater flow in eastern Honey Lake Valley varies throughout the Study Area, generally moving from the mountain and upland recharge areas to the valley lowlands. As mentioned above, groundwater appears to flow into the basin from the southeast corner of Honey Lake Valley (Virginia Mountains area), but may flow east out of the eastern side of the valley to Pyramid Lake Valley (via Astor Pass area) and Smoke Creek Desert (via Sand Pass area). A groundwater divide appears to be located about 3 miles west of the state line, resulting in no horizontal groundwater movement in this area (Lahontan GeoScience 2004; Webber 1996). Groundwater also flows south to the interior of eastern Honey Lake Valley from the northern mountains.

Groundwater discharge from eastern Honey Lake Valley occurs from: 1) evapotranspiration; 2) subsurface outflow; and 3) production wells. Evapotranspiration occurs primarily from areas of shallow groundwater, phreatophytes, and playa water bodies. According to Handman *et al.* (1990), approximately 89 percent of total precipitation and stream flow into the study area is discharged by evapotranspiration on the surface. The remaining 11 percent is subject to evapotranspiration from shallow groundwater or discharges from the basin as subsurface outflow. Evapotranspiration rates from areas of phreatophytic vegetation generally ranges from 0.1 to 0.3 ft/yr (Handman *et al.* 1990; Walker & Associates 2004). Walker & Associates (2004) recommends that the extinction depth for evapotranspiration be specified as 30 feet.

Over the last 10 years, approximately 3,000 to 5,000 af/yr of groundwater has been pumped from irrigation wells in eastern Honey Lake Valley (i.e., Fish Springs Ranch); about 25 percent of this water is estimated to infiltrate back into the groundwater system (Handman *et al.* 1990). The "perennial" or "safe" yield of eastern Honey Lake Valley was determined by the Nevada State Engineer in 1991 to be 13,000 af/yr. This was affirmed by the Nevada Supreme Court and is the law of Nevada. The 13,000 af/yr was approved by the State Engineer as a water right for transferring the water to the Stead/Lemmon Valley Area for potable water supply. Some project reviewers (e.g., Mayo and Slossen 1992) believe that 13,000 af/yr is an overestimate of perennial yield for eastern Honey Lake Valley (see **Appendix C**).

In Nevada, withdrawal of groundwater from a basin is limited by law to an estimate of "perennial" or "safe" yield (NRS 533.371). Perennial yield is the maximum amount of natural groundwater discharge that can be salvaged each year over the long-term by pumping without bringing about some undesired result (Nevada State Engineer 1974).

According to California Department of Water Resources Bulletin 118 (2004), total groundwater withdrawal from Honey Lake Valley is approximately 70,000 af/yr. Groundwater uses include agriculture at 51,000 af/yr; municipal and industrial uses at 15,000 af/yr; and environmental wetland uses at 4,000 af/yr.

Hydrogeology

Principal aquifers in eastern Honey Lake Valley are unconsolidated basin fill in the valley floor and fractured volcanic rocks in the surrounding uplands and mountains. Depth to granitic bedrock beneath the valley floor increases to about 5,000 feet in the northeast due to down-dropping east of the Warm Springs fault zone (Handman *et al.* 1990; Herlong Utilities Cooperative 2003).

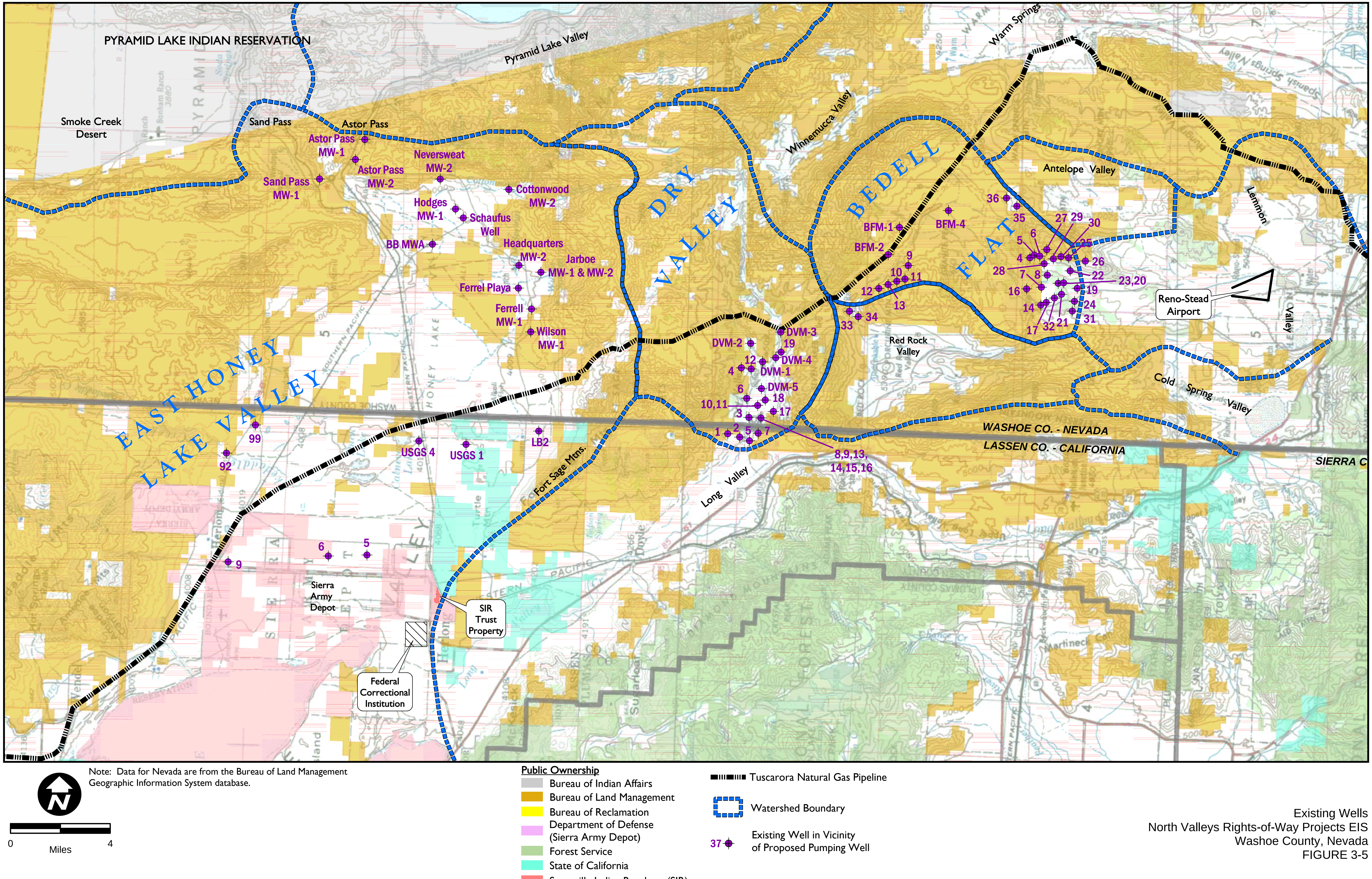
Well completion data for five irrigation wells (Wilson, Ferrel, Jarboe, Headquarters, and Hodges; **Figure 3-5**) at Fish Springs Ranch in southeastern Honey Lake Valley are presented in **Table 3-3**. These wells are completed to depths of 246 to 492 feet, with depth to water in the range of 25 to 60 feet below ground surface. Four of the wells are completed in volcanic rocks, and one well is completed in valley-fill sediment. The groundwater surface for this "regional" basin-wide system is at an elevation in the range of about 3900 to 4100 feet amsl.

The Washoe County Utility Division completed 26 wells in the vicinity of Fish Springs Ranch in 1989-90 as part of the Truckee Meadows Project. These wells included monitoring and observation wells used during extensive aquifer testing by pumping the irrigation wells mentioned above. Wells were also installed in the Sand Pass and Astor Pass areas to investigate potential interbasin groundwater flow out of eastern Honey Lake Valley. Washoe County monitored water levels in the wells monthly through spring 1991. Monitoring frequency diminished to annual measurements by spring 1999 when the program was terminated.

In March 2003, Fish Springs Ranch began monitoring water levels in 13 of the Washoe County wells. Each well was equipped with a recorder to collect hourly depth to water measurements. Water levels in these wells generally fluctuate several feet in response to pumping; however, water levels generally recover during the non-irrigation season.

Mean horizontal hydraulic conductivity of valley-fill material in eastern Honey Lake Valley is estimated to be 8 ft/day (Handman *et al.* 1990). In general, permeability is highest in the alluvial fan deposits along the mountain fronts, and in fractured volcanic rocks in the mountains and underlying portions of the valley floor. Lowest permeability likely is in the massive granite bedrock. Permeability of valley-fill sediment generally decreases with depth and toward the basin center.

EIS\north_valley\arcmap\draft_eis\exist_well.mxd



Existing Wells
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 3-5

TABLE 3-3
Completion Data and Aquifer Characteristics for Selected Wells in Honey Lake Valley, Dry Valley, and Bedell Flat

Well ID	Location (Qtr, Sec, Twp/Rng)	Year Drilled	Diameter (inches)	Total Depth (feet)	Approx. Water Depth (feet)	Primary Lithology	Transmissivity ($feet^2$/day)	Water Elevation (feet amsl)	Use
Southeastern Honey Lake Valley – Fish Springs Ranch Irrigation Wells									
Wilson	NW,SE,Sec26, T26N,R18E	1985	16	440	40	Alluvium	6,700 – 21,000	*	Irrigation
Ferrel	NE,SW,Sec25, T26N,R18E	1975	12.75	246	25	Alluvium/ volcanics	7,700 – 24,000	*	Irrigation
Jarboe	SE,SE,Sec30, T26N,R19E	1984	16 / 12.75	492	60	Alluvium/ volcanics	5,000 – 50,000	*	Irrigation
Head-quarters	NE,NW,Sec29 T26N,R19E	1954	14	400	50	Volcanic bedrock	12,000 – 67,000	*	Irrigation
Hodges	SE,SW,Sec10, T26N,R19E	1980	12.75	255	40	Volcanic bedrock	18,000 – 43,000	*	Irrigation
Western Dry Valley (wells located in T24N, R18E, unless otherwise specified)									
DVM-1	NW,SE,Sec10	2004	6	710	-32	Basin fill	90 – 305	4533	Monitor
DVM-2	NE,NW,Sec11	2005	6	780	-5	Volcanics	185 – 240	4645	Monitor
DVM-3	NE,NE,Sec14	2005	6	700	10	Basin fill	335 – 1080	4585	Monitor
DVM-4	NW,NE,Sec15	2005	6	710	-5	Basin fill	150 - 320	4510	Monitor
DVM-5	NE,SW,Sec9	Not drilled	---	---	---	---	---	---	Monitor
Marymee-4	SW,NW,Sec9	---	16	350	37	Basin fill	---	4428	Domestic
Lenz-17	SW,SW,Sec8	---	8	100	29	Basin fill	---	4409	Domestic& Irrigation
USGS-3	SE,NE,Sec9	2002	6	140	3	Basin fill	1,200 – 1,500	4401	Monitor
USGS-8	NE,SE,Sec7	2002	2	150	6	Basin fill	---	4396	Monitor
USGS-9	NE,SE,Sec7	2002	2	385	10	Basin fill	---	4392	Monitor
USGS-10	NW,SW,Sec8	2002	2	32	3	Alluvium	---	4406	Monitor
USGS-11	NW,SW,Sec8	2002	2	32	3	Alluvium	---	4405	Monitor
USGS-14	SE,NE,Sec7	2002	2	40	6	Alluviuim	---	4398	Monitor
USGS-15	SE,NE,Sec7	2002	2	250	11	Basin fill	---	4393	Monitor
USGS-16	SE,NE,Sec7	2002	2	547	17	Basin fill	---	4387	Monitor
Irrigation-13	Sec7, T25N,R18E	---	16	440	11	Basin fill	1,200 – 1,500	4395	Irrigation
Bedell Flat (wells located in T23N, R19E, unless otherwise specified)									
BFM-1	NW,NE,Sec9	1972	16	950	46	Basin fill	22,436	4897	Test Well
BFM-2	SE,SE,Sec5	1978	12.75	400	63	Basin fill	29,915	4879	Test Well
BLM Well	SE,SW,Sec22	---	---	224	180	Basin fill	---	4909	Stockwater
Bloom-35	SE,SE,Sec35	---	---	650	430	Basin fill	---	4909	Domestic
Nelson-24	Sec07, T22N,R19E	---	---	275	155	Fractured Bedrock	---	5669	Domestic
Etcheverry-16	Sec.06, T22N,R19E	---	---	225	61	Fractured Bedrock	---	5681	Domestic

Source: BLM 1993; ECO:LOGIC 2002; William E. Nork, Inc. 1991; InterFlow Hydrology and Cordilleran Hydrology 2003; InterFlow 2004a; Stantec and Cordilleran Hydrology 2000; Berger *et al.* 2004.

Note: --- = unknown or not applicable. * = water elevation data not available without removing pump. T = Township; R = Range; Sec = Section; Qtr = Quarter Section; amsl = above mean sea level. See **Figure 3-5** for well locations.

Prior to 1989, seven wells in eastern Honey Lake Valley were subject to pumping tests with resulting transmissivity values of 50 to 30,000 ft^2/day (William E. Nork Inc. 1991). In 1989, five irrigation wells were tested by Washoe County, with resulting transmissivity values of 9,500 to 67,000 ft^2/day (William E. Nork Inc. 1991). Five additional wells were test pumped in 1990, four of which are completed in volcanics, including the Sand Pass and Astor Pass wells. Transmissivities for the wells completed in volcanics are in the range of 25 to 14,000 ft^2/day (William E. Nork Inc. 1991).

Sierra Army Depot Area

Monitoring and supply wells in the Sierra Army Depot (Depot) area in western Honey Lake Valley, California (**Figure 3-1**) are completed in valley-fill deposits. Mean hydraulic conductivity of the unconsolidated sediment and volcanic rocks is approximately 8 ft/day (Harding Lawson Assoc. 1994). Depth to groundwater varies over the Depot area, ranging from a few feet adjacent to Honey Lake, to about 120 feet near the south end of the Depot (Harding Lawson Associates 1994). Elevation of the water table is about 3,990 feet amsl.

Groundwater pumping for potable and irrigation purposes at the Depot began in 1942, with an average pumping rate of 1,500 to 2,000 af/yr during the 1980s (BLM 1993). This pumping was distributed between four water supply wells located in the southern part of the Depot. A 14-day pumping test was performed for one of the wells at rates of up to 2,350 gal/min. Transmissivity calculated from the drawdown and recovery data ranged from 9,000 to 11,000 ft^2/day (Herlong Utilities Cooperative 2003).

Groundwater flow is generally to the north in the southern part of the Depot, and to the west-southwest in the northern part of the property (Harding Lawson Associates 1994). Groundwater in the western part of the Depot has a slight westward component of flow. A groundwater divide is located along the east-central portion of the Depot that separates east and west flowing groundwater. This groundwater divide is in a similar location to the divide described previously for eastern Honey Lake Valley.

Twenty-three contaminated areas have been identified at the Depot (California Department of Toxic Substances Control (DTSC), 2005). Hazardous wastes at the site include explosives, solvents, waste oil, paint thinner, and metals. Environmental assessment work began at the Depot in 1979, with a Master Environmental Plan (MEP) completed in 1988 to prioritize investigation and remediation at the 23 operable units (California DTSC 2005). Remediation activities implemented to date have included: soil removal, in-situ bioremediation, bioventing, vacuum vapor extraction, and groundwater pump-and-treat (California DTSC 2005).

DRY VALLEY

The Fort Sage Mountains and Virginia Range are on the north side of Dry Valley. The southern part of Dry Valley is bound by Seven Lakes Mountain and Dogskin Mountain. These mountains reach elevations of about 6000 to 9000 feet amsl. Lower (west-central) Dry Valley is the location of two proposed production wells by Intermountain Water Supply. This part of the valley floor is 1 to 1.5 miles wide and 4 miles long, with an elevation of about 4400 to 4800 feet amsl.

Recharge/Discharge

Rush and Glancy (1967) estimated long-term average groundwater recharge to Dry Valley of about 2,400 af/yr from precipitation, with groundwater outflow of about 2,200 af/yr. Groundwater outflow from Dry Valley is believed to be primarily to the west into Long Valley, California; although some groundwater may flow out of the upper valley via the Walker-Lane fault or shear zone. The remaining 200 af/yr of recharge is balanced by evapotranspiration and consumptive use in Dry Valley. Rush and Glancy (1967) estimated 280 acres of phreatophytes in Dry Valley with a water consumption of 80 af/yr.

Two methods of estimating recharge (Maxey-Eakin and Berger-Nichols) to Dry Valley were used by Stantec Consulting and Cordilleran Hydrology (2000). Results indicate groundwater recharge rates of 2,670 and 11,150 af/yr. The Desert Research Institute (DRI 2003) estimated groundwater recharge to Dry Valley from precipitation of 1,400 to 48,000 af/yr using the chloride mass balance method. During 2002-2004, the USGS conducted a hydrogeologic study of Dry Valley (Berger *et al.* 2004). This was a cooperative study with Washoe County intended to evaluate groundwater resources in Dry Valley for possible exportation. The USGS study included seismic-refraction profiling, installing monitoring wells, collecting borehole geophysical data, measuring water levels, performing aquifer tests, mapping phreatophytic vegetation and geology, and analyzing water samples from wells and springs. The USGS (Berger *et al.* 2004) estimated total groundwater discharge from Dry Valley ranges from about 700 to 1,000 af/yr. This total discharge comprises the following estimates: (1) subsurface outflow of 50 to 250 af/yr; and (2) evapotranspiration of 640 to 790 af/yr.

Areas of evapotranspiration were field mapped by the USGS (Berger *et al.* 2004) and partitioned into zones of plant cover using relations derived from satellite imagery. Evapotranspiration rates for each plant-cover zone were multiplied by the corresponding area and summed to estimate annual groundwater evapotranspiration.

The USGS (Berger *et al.* 2004) considers the amount of subsurface outflow to Honey Lake Valley and/or Winnemucca Valley via bedrock fractures associated primarily with the Walker Lane Fault zone negligible given the limited information available to evaluate this connection. The amount of groundwater outflow from Dry Valley westward to Long Valley, California was estimated using results of seismic-refraction profiling, installation of monitoring wells, borehole geophysical data, water level measurements, and aquifer tests.

The "perennial" or "safe" yield of Dry Valley was determined by the Nevada State Engineer in 2002 to be 3,000 af/yr, along with a water right for transfer of this water to the Stead/Lemmon Valley Area for potable water supply.

Hydrogeology

Dry Valley is comprised of complexly faulted mountain blocks with the faults oriented southeast to northwest (Stantec Consulting and Cordilleran Hydrology 2000). The faults are part of the Walker-Lane fault/shear zone. The Dry Valley floor is composed of valley-fill sediment that is over 1,000 feet thick.

Existing wells in Dry Valley consist of irrigation, domestic, stock, and monitoring wells. The USGS inventoried 19 wells in the valley, eight of which were installed by the USGS in 2002 (Berger *et al.* 2004). These eight monitoring wells, as well as three of the other domestic and irrigation wells are presented in **Table 3-3** and shown on **Figure 3-5**. All of the wells are completed in unconsolidated valley-fill sediment. The three domestic/irrigation wells are completed to depths of 100 to 440 feet. The eight USGS monitoring wells are completed to depths of from 32 to 547 feet.

The eight USGS monitoring wells were installed in five boreholes located near the state line in western Dry Valley (**Figure 3-5**). Depth to water is less than 10 feet near the valley floor, and increases to 30 feet or more near the toe of alluvial fans on the southern and northern sides of the valley floor. Groundwater elevations indicate that flow in the valley floor is westward toward Long Valley, California. The water table gradient increases from 0.003 ft/ft east of the state line to 0.005 ft/ft west of the state line (Berger *et al.* 2004). Nested piezometers installed by the USGS indicate a downward vertical hydraulic gradient, although vertical hydraulic conductivity is low due to interbedded clay.

As stated in the previous section, there is potential for groundwater outflow through bedrock fractures associated with the Walker Lane fault zone in upper Dry Valley. Groundwater in the fault zone would likely move southeast to Winnemucca Valley and/or northwest to Honey Lake Valley. The USGS, however, believes that there likely is no significant groundwater outflow to these areas due to similar elevations of phreatophytes between Dry Valley and Winnemucca Valley, and the lack of springs and seepage in Honey Lake Valley where the fault zone intersect the valley floor near the state line (Berger *et al.* 2004).

Constant discharge pumping tests were performed by the USGS in two Dry Valley wells, with resulting transmissivity values of 1,200 to 1,500 ft^2/day (Berger *et al.* 2004). Using the saturated thickness of aquifer encountered by each of the two wells, hydraulic conductivity is calculated at 3 to 12 ft/day.

During 2004-2005, Intermountain Water Supply completed four 6-inch diameter test wells (DVM-1 through DVM-4) in Dry Valley approximately 2 to 3 miles east of the state-line (**Figure 3-5** and **Table 3-3**). The wells range in depth from 700 to 780 feet, and typically encountered an upper unconfined aquifer extending to a depth of approximately 250 feet, and a lower confined aquifer below a depth of approximately 500 feet. Both aquifers are in alluvium consisting of interbedded gravel, sand, and clay. The aquifers are separated by an interval of alluvium containing greater amounts of clay. One of the wells (DVM-2), however, is completed in volcanic bedrock.

Depth to water in the unconfined aquifer is about 5 feet below land surface. Potentiometric head of the confined aquifer is about 5 to 30 feet above land surface, indicating an upward vertical hydraulic gradient. Water produced from some of the test wells is slightly geothermal (75 to 85 ^{o}F) which comes from the confined aquifer. Two samples from well DVM-1 indicate the water meets drinking water standards, with TDS of 210 mg/L (InterFlow Hydrology 2004b).

Results of constant discharge and step-drawdown pumping tests indicate the aquifers have transmissivities in the range of about 100 to 1,000 ft^2/day, which are low to moderate for typical alluvial basin-fill sediments. A fifth monitoring well (DVM-5; **Figure 3-5**) has not yet been completed by Intermountain Water Supply.

BEDELL FLAT

Bedell Flat valley floor has an elevation of about 5,000 feet amsl, draining northwest to Red Rock Valley. Width and length of Bedell Flat are about 5.5 miles and 8.5 miles, respectively. Mountains surrounding Bedell Flat include Dogskin Mountain to the north, Sand Hills to the west, Freds Mountain to the south, and unnamed hills to the east. Elevation of the mountains ranges from about 6000 to 7500 feet amsl.

Recharge/Discharge

Groundwater recharge to Bedell Flat was estimated by InterFlow Hydrology and Cordilleran Hydrology (2003) using two methods (Maxey-Eakin and Chloride-Balance). Results show groundwater recharge rates of 1,100 and 1,500 af/yr.

Subsurface outflow of groundwater is believed to occur from Bedell Flat to Red Rock Valley near the northwest side of the basin where depth to groundwater is shallow near Campbell Spring (InterFlow Hydrology and Cordilleran Hydrology 2003; InterFlow Hydrology 2004a). Some groundwater flow may also occur through the hills dividing Antelope Valley from Bedell Flat. Groundwater discharge occurs via evapotranspiration (30 af/yr), springs (50 af/yr), wells (70 af/yr), and subsurface outflow (85 af/yr to Red Rock Valley and 1,100 af/yr unaccounted outflow) (InterFlow Hydrology and Cordilleran Hydrology 2003). Interflow Hydrology (2004a) interprets Bedell Flat to be in a state of hydrologic equilibrium with a total natural groundwater recharge and discharge of approximately 1,300 af/yr.

The "perennial" or "safe" yield of Bedell Flat was determined by the Nevada State Engineer in 2004 to be 300 af/yr. State Engineer Ruling 5429, however, granted only 144 af/yr to Intermountain Water Supply as a water right for transferring this water to the Stead/Lemmon Valley Area for potable water supply. Intermountain Water Supply, however, has reapplied for 356 af/yr to the Nevada State Engineer so that the total water right for transferring groundwater from Bedell Flat would be 500 af/yr (Proposed Action).

Hydrogeology

Depth to groundwater in Bedell Flat ranges from over 180 feet in the central basin area, to near ground surface at the northwest side of the basin (InterFlow Hydrology and Cordilleran Hydrology 2003). Groundwater elevations are about 5,000 to 5,600 feet in the south half of Bedell Flat, and about 4,900 feet in the northwest part of the basin. According to Berger *et al.* (2001), exposures of older basin-fill deposits cover about 30 percent of the drainage area in Bedell Flat, and younger alluvium covers about half of the valley. Thickness of valley-fill deposits decreases to the northwest corner of Bedell Flat and is up to 2,500 feet thick (includes some volcanic rocks) in the center of the basin (Berger *et al.* 2001). The presence of shallow groundwater in the northwest part of Bedell Flat may be related to the thinning sediment.

Approximately 35 domestic wells have been drilled in the southern portion of Bedell Flat (**Figure 3-5**). These wells typically are completed to depths ranging from 150 to 850 feet, most of which are into volcanic rocks (InterFlow Hydrology and Cordilleran Hydrology 2003).

In the 1970s, two production-capacity wells (BF-1 and BF-2; **Figure 3-5** and **Table 3-3**) were drilled in the northwest part of the basin (InterFlow Hydrology and Cordilleran Hydrology 2003). Well BF-1 was completed to a depth of 950 feet, with granite bedrock encountered at 944 feet. This well was tested by pumping at rates ranging from 180 to 690 gal/min. Depth to water in well BF-1 was about 53 feet below ground surface. Production well BF-2 was completed to a depth of 400 feet, with a static water level of 63 feet below ground surface. This well was test pumped a rates of 200 to 450 gal/min. The resulting transmissivity values calculated from these pumping tests are about 22,000 and 30,000 ft^2/day, with hydraulic conductivity of about 1.0 ft/day (InterFlow Hydrology 2004a). Based on well lithology, the valley-fill aquifer is unconfined to semi-confined (InterFlow Hydrology 2004a).

ANTELOPE AND LEMMON VALLEYS

Antelope Valley is bounded on the east by Hungry Mountain and Warm Springs Mountain, on the west by Fred's Mountain, on the south by two unnamed mountains that separate Antelope Valley from Lemmon Valley, and on the north by a series of low hills that separate Antelope Valley from Bedell Flat (Berger *et al.* 2001). The Antelope Valley floor is about 2 miles wide and 5 miles long, with a playa in the lowest part of the basin (5100 feet elevation). Thickness of valley-fill deposits in Antelope Valley is not greater than about 300 feet, suggesting limited groundwater volume compared to other basins in the study area (Berger *et al.* 2001).

Depth to groundwater in Lemmon Valley varies from 10 to 100 feet, with a decline of 35 to 50 feet that has occurred since the early 1970s due to domestic and industrial uses (BLM 1993). Recharge from golf course irrigation and septic systems has raised the groundwater table in some areas (BLM 1993). Subsurface inflow and outflow at Lemmon Valley likely are minor. The Nevada State Engineer specified a perennial or safe yield for Lemmon Valley at 1,500 af/yr (BLM 1993).

GROUNDWATER QUALITY

This section describes groundwater quality characteristics based on samples collected and analyzed from wells in Honey Lake Valley, Dry Valley, and Bedell Flat.

EASTERN HONEY LAKE VALLEY

Quality of water in eastern Honey Lake Valley is characterized by sodium and bicarbonate as the predominant ions. Sodium, chloride, and TDS increase toward the center of the basin, with increasing depth, and with geothermal water. Isotope analysis of water samples from Honey Lake Valley by Bohm (1990) indicates that the playa areas are groundwater sinks where evaporation causes high salinity.

Concentrations of TDS have been determined for numerous wells in Honey Lake Valley (BLM 1993). TDS levels in groundwater near the eastern Honey Lake Valley playa area are high (up to 50,000 mg/L) (BLM 1993). South of the playa area, TDS is in the range of 100 to 400 mg/L. In the vicinity of the proposed Fish Springs Ranch wellfield southeast of the playa, TDS in groundwater ranges from about 200 to 300 mg/L. TDS concentrations are in the range of 1,600 to 2,500 mg/L for wells completed in the vicinity of Sand and Astor Passes (northeast of proposed Fish Springs Ranch wellfield).

Water samples were collected and analyzed from the irrigation wells at Fish Springs Ranch (Wilson/Ford, Farrel, Jarboe, Headquarters, and Hodges; **Figure 3-5**) during 1984-90, 2003, and 2005. These wells are located near the proposed production wells shown on **Figure 3-1**. Results of the analyses performed in 2003 are presented in **Table 3-4**, and more recent comprehensive water quality results from these wells sampled in June 2005 are summarized in **Appendix E**. The 2003-2005 data show variable quality, with TDS in the range of 160 to 490 mg/L, sodium from 24 to 140 mg/L, and sulfate ranging from 6 to 230 mg/L. Highest concentrations for all of the above constituents are from the Wilson/Ford well which is located closest to the playa. Concentrations of metals from all irrigation wells are low; however, arsenic is elevated (0.039 mg/L) in the Wilson/Ford well sample. This arsenic concentration exceeds the revised arsenic drinking water standard of 0.01 mg/L that becomes effective in January 2006. Results of other groundwater samples collected in 1986 and 1989 show that three of the five wells at Fish Springs Ranch exceeded the pending arsenic standard. For samples and parameters presented in **Table 3-4** and **Appendix E**, no other drinking water standards are exceeded for the Fish Springs Ranch irrigation wells.

TABLE 3-4
Chemical Analysis of Groundwater Samples from
Honey Lake Valley, Dry Valley, and Bedell Flat

Parameter	Water Quality Analyses (milligrams per liter unless otherwise noted)									
	Honey Lake Valley - Fish Springs Ranch					Bedell Flat		Dry Valley		
	Wilson	Farrel	Jarboe	Head-quarters	Hodges	BF-1	BF-2	USGS-9	USGS-14	USGS-19
TDS	490	380	160	180	190	138	144	435*	530*	528*
pH (std. units)	8.1	8.1	8.0	8.3	7.9	8.2	8.1	7.4	7.4	7.5
Turbidity (NTU)	<0.1	0.2	0.4	<0.1	0.2	---	---	---	---	---
Alkalinity	86	140	94	97	120	110	107	190	208	210
Calcium	21	25	15	2.9	11	22	26	26.5	22.0	35.3
Magnesium	1.9	6	5.1	1.5	5.1	5	4	13.8	9.8	20.2
Potassium	3.4	8.1	6.2	7.1	7.2	3	2	3.4	2.5	2.0
Sodium	130	90	24	44	34	23	22	52	87	53
Chloride	21	41	7	6.4	6.5	4	5	10.4	14.8	19.6
Fluoride	1.2	0.41	0.15	0.2	0.15	0.29	0.22	0.23	0.37	0.5
Sulfate	230	93	9.9	8.3	6.7	19	20	15.8	29.8	20.0
Nitrate	<0.05	1.5	1.1	1.1	0.87	0.65	1.1	0.8	<0.06	0.94
Arsenic	0.039	0.008	0.002	0.003	0.001	0.005	---	0.0075	0.0069	0.005
Barium	<0.001	0.007	0.004	0.008	0.031	---	---	0.039	0.048	0.05
Copper	<0.001	<0.001	<0.001	<0.001	<0.001	---	---	0.0006	0.0006	0.0055
Iron	<0.05	<0.05	0.08	<0.05	<0.05	0.06	0.02	<0.01	0.019	<0.008
Lead	<0.001	<0.001	<0.001	<0.001	<0.001	---	---	<.0008	<.0008	.00018
Manganese	0.022	<0.001	0.012	<0.001	<0.001	0.01	---	0.0513	0.407	0.103
Zinc	0.017	0.014	0.017	0.01	0.013	---	---	---	0.001	0.239

Source: ECO:LOGIC 2003; InterFlow Hydrology and Cordilleran Hydrology 2003; Berger *et al.* 2004.

Note:

1. All units in milligrams per liter (mg/L) unless otherwise shown in the first column.
2. TDS = total dissolved solids; NTU = nephelometric turbidity units.
3. Fish Springs Ranch wells sampled November 2003; Bedell Flat wells sampled August 1978; Dry Valley wells sampled May/June 2003.
4. * TDS values for Dry Valley wells are Specific Conductance in μS/cm.
5. For wells USGS-9, USGS-14, and USGS-19 in Dry Valley, manganese in groundwater exceeds the "secondary" drinking water standard of 0.05 mg/L. Groundwater from the Wilson well in eastern Honey Lake Valley will exceed the revised arsenic drinking water standard of 0.01 mg/L effective January 2006. Refer to **Table 3-5** for water quality standards.
6. See **Figure 3-5** for locations of wells.

Sierra Army Depot Area

Groundwater quality at the Sierra Army Depot is variable, with TDS in the range of 290 to 1,020 mg/L (BLM 1993). Potential contamination of groundwater has been identified at 23 areas of the Depot. The two primary groundwater contamination areas are at the Building 210 Area and Abandoned Landfill Area (Sierra Army Depot 2005), both located in the southern part of the Depot site approximately 5 to

6 miles west of the state-line. Results of site investigations show that gasoline, diesel, acetone, methylene ketone, TCE, TNT, lead, cadmium, copper, and chromium, have been detected in soil and groundwater in the Depot area (Harding Lawson Associates 1994).

DRY VALLEY

Water quality samples were collected and analyzed by the USGS (Berger *et al.* 2004) in three wells in Dry Valley (USGS-9, -14, -19; **Figure 3-5**). Results of these analyses (**Table 3-4**) show that specific conductance is in the range of 435 to 530 µS/cm, alkalinity ranges from 190 to 210 mg/L, and sulfate ranges from 15 to 30 mg/L. TDS was not reported for Dry Valley samples.

Field measurements also indicate these groundwater samples having temperature ranging from 12.5 to 18.5 ˚C, and dissolved oxygen in the range of 0.1 to 5.6 mg/L. Concentrations of some other constituents, including metals, are shown in **Table 3-4**. For the samples and parameters presented in **Table 3-4**, no drinking water standards are exceeded except for the secondary standard for manganese of 0.05 mg/L. Other metals were analyzed by the USGS (Berger *et al.* 2004) with results showing low or non-detectable concentrations.

BEDELL FLAT

Bedell Flat groundwater quality data are available for samples collected from three springs in the northern basin (BF-1 Stockwater, Settelmeyer, and Willow); two test wells in the north part of the watershed (BF-1 and BF-2); and five domestic wells in southern Bedell Flat (Richards, Hiibel, Reslock, Singley, and Leary) (**Figure 3-5**). Results of these analyses are presented by InterFlow Hydrology and Cordilleran Hydrology (2003), with selected parameters for test wells BF-1 and BF-2 included in **Table 3-4**. Wells BF-1 and BF-2 are completed to depths of 950 and 400 feet, with water levels of 46 and 63 feet, respectively (**Table 3-3**). Water quality data from these wells indicates TDS concentrations less than 150 mg/L, sulfate of about 20 mg/L, and low levels of ions and metals. For the samples and parameters presented in **Table 3-4**, no drinking water standards are exceeded. Groundwater quality also is relatively good from domestic wells in the southern part of the valley, with TDS in the range of 170 to 320 mg/L (InterFlow Hydrology and Cordilleran Hydrology 2003).

ANTELOPE AND LEMMON VALLEYS

Quality of groundwater in Antelope Valley is unknown. In Lemmon Valley, groundwater quality is variable, with the poorest quality occurring near the playas (TDS up to 25,000 mg/L) (BLM 1993). Increasing nitrate concentrations have been observed in some domestic wells, likely due to septic systems throughout subdivision areas.

WATER USE/RIGHTS

This section discusses water use and water rights in the Study Area other than those associated with the Proposed Actions, which are described previously in this document.

NEVADA

Water rights for new surface water and groundwater supplies in Nevada are provided through the State Engineer's permitting process. The exception is that no permit is required for a domestic well serving a single-family dwelling and withdrawing no more than 1,800 gallons water per day. Proof of beneficial use of permitted water supplies and documentation of water consumption over a 1-year period are typically required. Numerous springs throughout the study area are used primarily for stock watering. Water use in eastern Honey Lake Valley is primarily associated with the irrigation wells at Fish Springs Ranch. These wells have been producing approximately 4,000 to 5,000 af/yr during the irrigation season. Historic records of pumping from Fish Springs Ranch since 1988 show that pumping rates have been in the range of 4,100 to 5,900 af/yr. Other wells were identified in eastern Honey Lake Valley by Handman *et al.* (1990), but their use is unknown.

In Dry Valley, only one well (Lenz well) is currently used for domestic and irrigation purposes (Stantec Consulting and Cordilleran Hydrology 2000). This well is located near the center of the valley at the state line.

In Bedell Flat, approximately 35 domestic wells have been completed in the southern part of the basin as part of the Red Rock Estates subdivision. These wells generally are completed in fractured bedrock (InterFlow Hydrology and Cordilleran Hydrology 2003). Non-domestic wells in Bedell Flat include the Animal Ark Wildlife Center well, International Community of Christ Church well, and a BLM stockwater well (InterFlow Hydrology and Cordilleran Hydrology 2003). Numerous domestic wells are also located in Lemmon Valley.

CALIFORNIA

Water rights for new surface water supplies in California are subject to issuance of a permit by the State Water Resources Control Board. The State of California does not regulate extraction and appropriation of groundwater. However, local government and agencies can establish special districts or ordinances for management of groundwater resources. Groundwater Management Districts have been established for Honey Lake Valley and Long Valley in California (California Department of Water Resources 2005). At present, neither district is active, but they can be activated when needed. Lassen County has an ordinance requiring a permit to export groundwater from the county.

According to California Department of Water Resources Bulletin 118 (2004), total groundwater withdrawal from Honey Lake Valley is approximately 70,000 af/yr. Groundwater uses include agriculture at 51,000 af/yr; municipal and industrial uses at 15,000 af/yr; and environmental wetland uses at 4,000 af/yr.

Herlong Utilities Cooperative is the primary water supplier in the vicinity of the Sierra Army Depot and Federal Prison in western Honey Lake Valley. Two production wells were recently installed southwest of the Depot along lower Long Valley Creek. Estimated water supply from these wells will average 1,300 af/yr (Herlong Utilities Cooperative 2003). Several irrigation wells are located in Long Valley, California.

WATER QUALITY STANDARDS

Nevada surface water is regulated for quality standards established by the State of Nevada under Nevada Water Pollution Control regulations and statutes (Nevada Administrative Code [NAC] 445A.070 et seq.; Nevada Revised Statutes [NRS] 445A.300 et seq.) (**Table 3-5**). The State has established both narrative and numeric criteria. Statewide narrative criteria are applicable to all water. In addition to statewide narrative criteria, water quality standards for these three categories of water are included: class water, designated water, and toxic materials (toxic materials standards are in **Table 3-5**). Class water is water that is grouped together on the basis of the degree to which human impacts affect the beneficial uses of the waterbody. Designated water includes major waterbodies for which specific standards are established. Toxic standards are numeric criteria for toxic materials that apply to class and designated water and are specified for four beneficial use categories. Surface water in the Projects Area is neither class water nor designated water or tributaries to those water bodies. Narrative standards apply to surface water in the affected area. The Truckee River and its tributaries are classified as either designated water or class water.

SOIL RESOURCES

Information for soil resources in the Study Area (same as Projects Area) was obtained from the Soil Survey of Washoe County, Nevada, Central Part and South Part published by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) (USDA 1983a, 1983b). These surveys were completed by NRCS to an Order III level. The Soil Survey Geographic Database (SSURGO) data for these soil surveys were used to identify the mapping units proposed for disturbance as part of the proposed Projects (USDA 2004a, 2004b).

The Order III survey identifies mapping units generally named according to dominant soil series found in the unit. Mapping units along the proposed pipeline routes consist of phases of series, associations, and complexes with some miscellaneous areas, including rock outcrops.

TABLE 3-5
Water Quality Criteria and Standards for Nevada

Parameter (mg/L, unless otherwise specified) [1]	Federal Drinking Water Standard		Nevada Municipal or Domestic Supply	Aquatic Life [3]		Agriculture		Wildlife Propagation
	Primary MCL [2]	Secondary MCL [2]		1-Hour Ave. or Propagation	96-Hour Ave. or Put & Take	Irrigation	Stock Water	
Antimony	0.006	---	0.146	---	---	---	---	---
Arsenic	0.05	---	0.05	0.342 As(III)	0.18 As(III)	0.1	0.2	---
Barium	2.0	---	2.0	---	---	---	---	---
Beryllium	0.004	---	0	---	---	0.1	---	---
Boron	---	---	---	---	---	0.75	5.0	---
Cadmium	0.005	---	0.005	0.0053 [4]	0.0013 [4]	0.01	0.05	---
Chromium	0.10	---	0.10	0.015 Cr(VI)	0.01 Cr(VI)	0.1	1.0	---
Copper	1.3	1.0	---	0.0221 [4]	0.0142 [4]	0.2	0.5	---
Iron	---	0.3 [0.6]	---	1.0	1.0	5.0	---	---
Lead	0.015	---	0.05	0.0684 [4]	0.0013 [4]	5.0	0.1	---
Manganese	---	0.05 [0.1]	---	---	---	0.2	---	---
Mercury	0.002	---	0.002	0.002	0.000012	---	0.01	---
Molybdenum	---	---	---	0.019	0.019	---	---	---
Nickel	0.1	---	0.0134	1.699 [4]	0.189 [4]	0.2	---	---
Selenium	0.05	---	0.05	0.02	0.005	0.02	0.05	---
Silver	---	---	---	0.0069 [4]	0.0069 [4]	---	---	---
Thallium	0.002	---	0.013	---	---	---	---	---
Zinc	---	5.0	---	0.140 [4]	0.127 [4]	2.0	25	---
Cyanide (WAD)	0.2	---	0.2	0.022	0.0052	---	---	---
Alkalinity	---	---	---	<25% change		---	---	30 – 130
Chloride	---	250 [400]	250 [400]	---	---	---	1,500	1,500
Color (PCU)	---	15	75	---	---	---	---	---
Dissolved Oxygen	---	---	Aerobic	5.0	5.0	---	Aerobic	Aerobic
Fluoride	4.0	2.0	---	---	---	1.0	2.0	---
Nitrate as N	10	---	10	90(w)	90(w)	---	100	100
Phosphorus, total as P	---	---	---	---	---	---	---	---
pH (su)	---	6.5 – 8.5	5.0 – 9.0	6.5 – 9.0	6.5 – 9.0	4.5 – 9.0	5.0 – 9.0	7.0 – 9.2
Sulfate	---	250 [500]	250 [500]	---	---	---	---	---
Temp (°C)	---	---	---	---	Site-specific	---	---	---
TDS	---	500 [1000]	500 [1000]	---	---	---	3,000	---
TSS	---	---	---	25 – 80	25 – 80	---	---	---
Turbidity (NTU)	1.0	---	---	50(w); 10(c)	50(w); 10(c)	---	---	---

1 mg/L = milligrams per liter; PCU = photoelectric color units; SU = standard pH units; NTU = nephelometric turbidity units; TDS = total dissolved solids; TSS = total suspended solids; °C = degrees Celsius. WAD = weak acid dissociable. Standards for metals are expressed as total recoverable, except those metals that are hardness-dependent where the standard applies to the dissolved fraction (see note #3 below).

2 MCL = Maximum Contaminant Level. Numbers in brackets [ ] are mandatory secondary standards for public water systems.

3 (w) = warm water; (c) = cold water; no letter designation indicates criteria are common to both warm and cold water.

4 Parameter dependent on hardness; see NAC 445A.144 for equations to determine concentration; values in this table calculated assuming a hardness of 150 mg/L as $CaCO_3$. Example: Cadmium 1-hour average = 0.85 exp {1.128 in (hardness) – 3.828} = 0.85 exp {1.824} = 0.85 (6.2) = 5.3 µg/L = 0.0053 mg/L.

Source: Nevada Administrative Code 445A.119 and 144.

Proposed pipeline rights-of-way generally traverse valley floors and side slopes through the majority of the routes. Soil types in these areas have developed from alluvial deposits and are characterized as moderately deep to very deep. Along upper valley slopes and along ridges and divides, soil profiles are shallower and bedrock is at or near the surface. Some leeward slopes have aeolian deposits and series, such as the Incy, have developed primarily from these materials. Additionally, soil at the north end of the Fish Springs Ranch pipeline is comprised of strongly alkaline smectitic clay associated with an adjacent Playa.

Soil in the Projects Area generally exhibits low to moderate available water holding capacity. Permeability is variable with most soil having slow to moderately slow permeability. Surface runoff varies from very slow to rapid. Approximately 14 miles of the proposed pipeline routes would occur adjacent to previously disturbed soil along the Tuscarora Natural Gas Pipeline right-of-way.

Soil that developed in alluvial valleys is generally deep to very deep (60 inches or more) and includes the Haybourne-Wedertz-Mottsville Association, Reno-Galeppi-Chalco Association, and Oest-Orr-Leviathan Association. Subsurface weak cementation is encountered on pediments, alluvial fans, and terraces in the Wedertz and Galeppi Series and hardpans occur in the Reno series soil at depth of 20 to 40 inches. The Incy series, also found in the Projects Area, formed from eolian deposits and is susceptible to wind erosion.

The Acrelane-Graufels-Glenbrook Association and Indiano-Flex-Koontz Associations are encountered on low hills and foothills. These soil types are very shallow to moderately deep and occur on moderate to steep slopes. The Acrelane and Glenbrook Series are shallow to granitic bedrock and are coarse textured with very low water holding capacity. Graufels and Indiano soil types are moderately deep (20 to 40 inches) to bedrock and generally coarse textured soil. Other shallow soil types that have developed on weathered slopes along the proposed pipeline routes include the Luppino and Terca Series.

Soil in the proposed Projects rights-of-way may be of limited value for reclamation purposes if one or more restrictive properties are present. Restrictive properties are physical or chemical characteristics that can inhibit plant growth or make the soil structurally unsound. Soil properties considered most important when determining use as salvage material include: texture, profile depth to bedrock or hardpan and coarse fragments (greater than 3 inches in diameter) in the profile. Non-soil features such as steep slopes, rough terrain, and rock outcrop may limit access for salvage activities, though these particular parameters are generally not extensive in the Projects Area.

Shallow depth to a restrictive layer is the most common limiting characteristic of soil in the Projects Area. Information on each soil series including percent of soil series included in each mapping unit, slope range, landform, depth to induration or bedrock, rooting restricting depth (RRD), permeability, available water holding capacity (AWC), surface runoff class, hydrologic group, and erosion hazard potential is contained in the published Soil Surveys of Washoe County, Nevada (Central and South

Parts). NRCS database also provided cation exchange capacity (CEC), sodium adsorption ratio (SAR), percent organic matter, percent calcium carbonate, and percent weight rock fragments.

SOIL EROSION HAZARD

The rate of erosion (undisturbed soil conditions) is dependent primarily on slope, soil surface texture, and soil surface cover. The NRCS rates suitability of in-situ soil for potential erosion hazards of water and wind. NRCS erosion hazard ratings for soil in the Projects Area are summarized in the referenced USDA Soil Surveys (USDA 1983a, 1983b).

Hazard of water erosion is slight to moderate within the Projects Area, primarily due to soil surface texture, soil surface rock fragment cover, and gentle to moderately steep slopes. Acrelane and Stodick soil are exceptions within the Projects Area due to steep slopes encountered on alluvial fans and pediments. These units exhibit high water erosion potential.

Wind erosion hazard is generally slight to moderate, primarily due to occurrence of surface rock fragments and soil surface texture that is not susceptible to blowing. Exceptions include the Incy, Haybourne and Wedertz soil types that exhibit fine sandy surface textures susceptible to transport by wind.

VEGETATION RESOURCES

The North Valleys Projects Area is contained within the southwestern portion of the Intermountain Semi-Desert Province (Bailey 1995). Vegetation in the Study Area (same as Projects Area) is typical of Great Basin plant communities, reflecting a history of livestock grazing and periodic fires. Grazing has altered the composition of vegetation by reducing density and frequency of palatable grasses and woody riparian species; whereas, fires have reduced density and spatial extent of sagebrush, juniper, and other fire-intolerant species. A mosaic of burned and unburned areas extend from the south slope of Fort Sage Mountains through Bedell Flat to the northern portion of Antelope Valley. Much of the north slope of Fort Sage Mountains is devoid of shrubs due to fire. Some burned areas have been reseeded with crested wheatgrass (*Agropyron cristatum*) (BLM 1993).

Southeastern Honey Lake Valley is dominated by sagebrush with areas of salt desert shrubs. South of Honey Lake Valley to the terminus of the proposed pipelines, vegetation is dominated by sagebrush, with scattered rabbitbrush (*Chrysothamnus* spp.) and shadscale (*Atriplex canescens*). Juniper woodlands (*Juniperus osteosperma*) occur in scattered locations between Dry Valley and Bedell Flat. Springs and seeps, although comprising a small part of the Projects Area, provide habitat conditions that support a diversity of species not found on drier upland sites. During the spring, following winter's precipitation, a diversity of annual forbs is present in all habitats.

Big sagebrush (*Artemisia tridentata*) and low sagebrush (*Artemisia arbuscula*) predominate on upland sites. Juniper woodlands occur at the upper elevations with sagebrush communities. On dry lower slopes, sagebrush communities transition to shadscale communities that are tolerant of increasing soil aridity and salinity. On basin floors, which experience seasonally high groundwater levels, the shadscale community is replaced by a black greasewood (*Sarcobatus vermiculatus*) community (BLM 1993).

SPECIAL STATUS SPECIES

BLM Transmittal Sheet (6840.06C Special Status Species Management) provides policy and guidance for conservation of special-status species of plants and animals, and ecosystems on which they depend. Special-status species include those listed under the Endangered Species Act of 1973 or species proposed or candidates for listing under this act. Special-status species also include species listed by the state as threatened or endangered or designated by the BLM State Director as sensitive. Protection is provided for sensitive species to ensure that actions authorized, funded, or carried out do not contribute to the need for the species to be listed under the Endangered Species Act of 1973. Species may be designated sensitive if it:

- Could be become endangered or extirpated from the state, or within a significant portion of its range in the foreseeable future;
- Is under status review by the U.S. Fish and Wildlife Service;
- Is undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution and/or population density is such that federal listing may be necessary;
- Typically consists of small widely dispersed populations;
- Inhabits ecological refugia or specialized unique habitats; or
- Is state-listed, but may be better conserved through application of BLM sensitive species status.

One plant species, Steamboat buckwheat, listed as endangered under the Endangered Species Act of 1973, may have potential to occur in the Projects Area. This species is known from one location in Washoe County near the city of Reno.

Review of the Nevada Natural Heritage Program database on the Internet and information presented by Morefield (2001) identifies BLM sensitive plants with the potential to occur in the Projects Area. These species are presented in **Table 3-6**.

TABLE 3-6 Endangered and BLM Sensitive Plants Known to Occur in Projects Area		
Common Name	**Scientific Name**	**Habitat**
Tiehm milkvetch (sensitive)	*Astragalus tiehmii*	Whitish volcanic ash deposits weathering to deep clay soil on gentle slopes (elev. 5280 – 5750 feet)
Schoolcraft catseye (sensitive)	*Cryptantha schoolcraftii*	Whitish volcanic ash deposits weathering to deep clay soil (elev. 4880 – 5760 feet)
Crosby buckwheat (sensitive)	*Eriogounum crosbyae*	Whitish volcanic ash deposits weathering to deep clay on gentle to steep slopes (elev. 4600 – 7000 feet)
Steamboat buckwheat (endangered)	*Eriogonum ovalifolium var. williamsiae*	Shallow, poorly developed, dry soil derived from siliceous opaline sinter on wetland margins (elev 4565 – 4720 feet)
Prostrate buckwheat (sensitive)	*Eriogonum prociduum*	Basalt flows and barren volcanic tuff (elev. 4600 – 8320 feet)
Altered andesite buckwheat (sensitive)	*Eriogonum robustum*	Ridges, knolls, and steep slopes (elev. 4410 – 7325 feet) in conifer woodlands on soil derived from hydrothermal sulfide deposits
Sierra Valley mousetails (sensitive)	*Ivesia aperta var. aperta*	Benches and flats in vernally saturated meadows and seeps
Grimy mousetails (sensitive)	*Ivesia rhyparia var. rhypara*	Dry, barren outcrops or badlands of hydrothermally altered ash-fall tuff and shallow gravel (elev. 5370 – 6200 feet)
Webber Ivesia (sensitive)	*Ivesia webberi*	Shallow, heavy clay soils with gravelly surface over volcanic bedrock (4000 – 5950 feet)
Orocytes (sensitive)	*Orocytes nevadensis*	Stabilized dunes in desert saltbush communities (elev. 3000 – 5900 feet)
Playa phacelia (sensitive)	*Phacelia inundata*	Alkali playas (elev. 5300 – 5640 feet)
Altered andesite popcorn flower (sensitive)	*Plagiobothrys glomeratus*	Barren ridges and slopes (4850 – 6650 feet) on soils derived from weathered hydrothermal sulfide deposits
Williams combleaf (sensitive)	*Polyctenium williamsiae*	Margins and bottoms of non-alkaline seasonal lakes

Source: Nevada Natural Heritage Program 2004.

Sensitive plant surveys conducted in the Projects Area in June and July of 2004 (Westech 2004a) did not find any endangered or BLM sensitive species; however, Rams Horn Spring milkvetch (*Astragalus pulsiferae* var. *pulsiferae*), a species considered by the Nevada Natural Heritage Program to be critically imperiled due to extreme rarity, imminent threats, or biological factors was found at two locations in Bedell Flat on public land and two locations in Antelope Valley on private land. In addition, nine populations of Mojave prickly pear cactus (*Opuntia erinacea* var. *erinacea*) were found along proposed pipeline rights-of-way in Bedell Flat and Antelope Valley. Cacti are protected by Nevada state law (NRS 527.060 -120).

INVASIVE, NON-NATIVE SPECIES

Noxious weeds are defined under Nevada law (NRS 555.005) as any species of plant that is or is likely to be detrimental or destructive and detrimental to control or eradicate. Noxious weeds are damaging to the environment and local economy, and displace desirable vegetation. Often, noxious weeds proliferate where native vegetation has been removed or disturbed.

Forty-four species of noxious weeds have been identified in Nevada (NRS 555.101). Common species in the Projects Area include leafy spurge (*Euphorbia esula*), Scotch thistle (*Onopordum acanthium*), perennial pepperweed (*Lepidium latifolium*), musk thistle (C*arduus nutans*), spotted knapweed (*Centaurea maculosa*),

Russian knapweed (*Centaurea repens*), white top (*Cardaria draba*), and Dyer's wood (*Isatis tinctoria*) (Westech 2004a). **Table 3-7** contains a list of weeds and locations observed by Westech (2004a) in the Projects Area.

WETLANDS/RIPARIAN AREAS

Waters of the U.S. include wetlands and non-wetland waters of the U.S. Wetlands typically are associated with springs and wet drainages. Non-wetland waters of the U.S. are drainage channels (perennial, ephemeral, and intermittent) with a defined bank and bed, but do not support vegetation adapted to wetland growing conditions.

Wetlands are regulated under Section 404 of the Clean Water Act as a subset of Waters of the U.S. Wetlands are defined as areas that are inundated or saturated by surface water or groundwater at frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (U.S. Army Corps of Engineers 1987). Jurisdictional wetlands are contiguous with interstate waters (i.e., not isolated). Isolated wetlands are not connected with interstate waters and are not jurisdictional.

Wetlands in the Study Area (same *Water Resources* Study Area – watersheds shown on **Figure 3-1**) are associated with springs, seeps, flowing wells, playas, perennial streams, irrigation activities, and intermittent drainages. Most wetlands in the Study Area are marshes, wet meadows, and riparian fringes along drainages, dominated by herbaceous species (e.g., sedges, rushes, bulrushes, grasses, cattails, and non-woody plants). Some wetlands have an associated shrub component composed of greasewood, coyote willow (*Salix exigua*), and salt-cedar (*Tamarix* spp.).

Reconnaissance-level wetland surveys were performed by Westech (2004b) along the proposed water transmission pipeline corridors. These corridors would cross approximately 70 drainages, most of which are non-wetland waters of the U.S. (**Figure 3-6**). These crossing sites are described in **Table B-1** of **Appendix B**.

TABLE 3-7
Noxious Weed Locations in Projects Area

Location (GPS UTM Coordinates)[1]	Noxious Weed[2]	Density/Abundance	Comments
11T E0249087 N4435947	Scotch thistle	Few scattered plants.	Along road and under power lines. Not abundant.
11T E0248267 N4437153	Scotch thistle	One large cluster, >30 plants.	Confined to a small area but a robust population.
11T E0250863 N4441810	Tall whitetop & Scotch thistle	Only a few plants of each species.	Tall whitetop is along drainage ditch; thistle is along road.
11T E0250962 N4441860	Scotch thistle	Several scattered clusters.	Along the drainage ditch and along the road.
11T E0251089 N4441743	Scotch thistle	Several scattered clusters.	Along road corridor adjacent to irrigated hay fields.
11T E0251486 N4441661	Tall whitetop	Large population, densities > than 50 stems per 0.01 acre.	Extensive population along road corridor and into fields.
11T E0251743 N4441695	Tall whitetop & Scotch thistle	Few plants. < 20 individual tall whitetop; several thistles.	Few tall whitetop along ditch; thistle scattered along road.
11T E0252144 N4441788	Tall whitetop	Large population; densities > than 80 stems per 0.01 acre.	Extensive population along road and into wet fields.
11T E0253013 N4442000	Scotch thistle	Few scattered plants.	Located along roadside.
11T E0258404 N4446611	Scotch thistle	One large cluster, 20 mature plants.	Found in tall vegetation along fence line with many rosettes.
11S E0258168 N4414875	Scotch thistle	A small cluster of 7 plants.	Along edge of moist flat area.
11 E0249053 N4435786	Scotch thistle & Bull thistle	Approximately 20 Scotch and 10 bull thistle.	Confined in a small area along the edge of a wetland seep.
11 E0246923 N4439662	Scotch thistle	A few plants.	Confined to a small area.

Note: In many areas it was observed that herbicide treatments had been made on some of the Scotch thistle (*Onopordum acanthium*) populations and the treatments appeared to be successful. At the time of these surveys, no apparent treatment had been made on the Tall whitetop (*Lepidium latifolium*). Along the roads within the Fish Springs Ranch portion of the proposed pipeline corridor, the Tall whitetop populations were scattered and somewhat discontinuous. Though marked at several points, this could be considered one extensive population. Bull Thistle (*Cirsium vulgare*) was marked at one location growing with Scotch thistle. Though not designated a noxious weed, it is an aggressive, invasive weed.

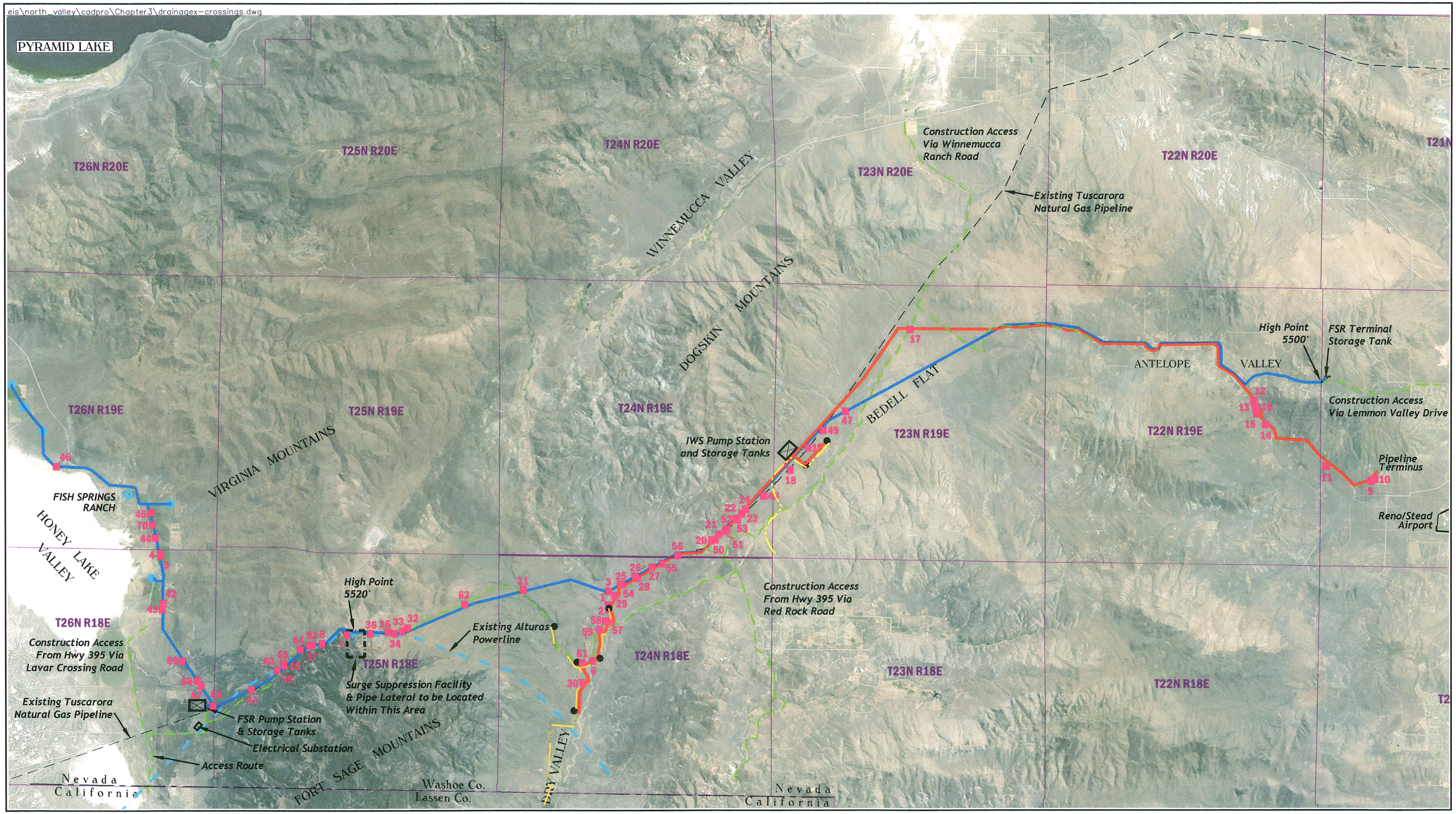
[1] Datum NAD 27

[2] Per Nevada Revised Statutes (NRS 555)

Source: Westech 2004a.

Riparian vegetation associated with perennial and ephemeral drainages are present along Hay, Wilcox, Cottonwood, and Dry Valley creeks. Vegetation in these areas consists of willow, cottonwood (*Populus* sp.), grasses, sedges (*Carex* spp.), rushes (*Juncus* spp.), cattail (*Typha* sp.), and horsetail (*Equisetum* spp.).

Westech (2004a) performed a spring/seep survey in the Study Area, most of which support wetlands, although the investigation wasn't a formal delineation of jurisdictional wetlands. Westech (2004a) found 58 springs and flowing wells in the Study Area (**Figure 3-4**). A listing of these sites is presented in **Table A-1** of **Appendix A**.



0 Miles 2

LEGEND

IWS	INTERMOUNTAIN WATER SUPPLY		PROPOSED IWS WATERLINE
FSR	FISH SPRINGS RANCH		PROPOSED FSR WATERLINE
	PROPOSED ACCESS ROUTES		PROPOSED UNDERGROUND ELECTRIC
	TUSCARORA NATURAL GAS PIPELINE		PROPOSED ABOVEGROUND ELECTRIC
	ALTURAS POWERLINE		PROPOSED IWS WELL
	TOWNSHIP AND RANGE		PROPOSED FSR WELL

20 CHANNEL CROSSING (SEE APPENDIX C FOR DESCRIPTION OF EACH SITE)

Drainage Channel Crossings
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 3-6

Twenty-nine springs and flowing wells were identified in eastern Honey Lake Valley and southern Smoke Creek Desert. Ten springs were located in Dry Valley, and 19 springs and flowing wells were identified in Bedell Flat. Water developments such as pipes, troughs, tanks, spring boxes, well casings, and fences were present at many sites.

The majority of springs and flowing well sites support herbaceous vegetation, frequently in combination with flowing water. Ponds were present at 14 sites, and shrub-dominated vegetation was found at four locations in northern Bedell Flat. Over one-half of the spring and flowing well areas (water and wetland-type vegetation) were estimated to be less than 0.1 acre in size. About one-third of sites were from 0.1 to 1.0 acre, and five sites were from 1.0 to 5 acres.

WILDLIFE RESOURCES

Wildlife species occupying the Study Area (same *Water Resources* Study Area – watersheds shown on **Figure 3-1**) are typically associated with sagebrush and grassland communities and juniper woodlands. Springs, seeps, and riparian areas provide important foraging and breeding habitat for aquatic as well as wide-ranging upland species. Large mammals that inhabit the Projects Area include mule deer, pronghorn antelope, coyote, mountain lions, bobcats, and badgers. Common small mammals include the black-tailed jackrabbit, mountain cottontail, white-tailed antelope squirrel, deer mice, kangaroo rats, northern pocket gopher, bushy-tailed woodrat, and least chipmunk. Numerous bat species have potential to occur in the Projects Area. Raptors include hawks, eagles, owls, and falcons. Waterfowl and shorebirds are associated with wetlands and playas of the Study Area. Upland game birds occurring in the Projects Area include sage grouse, California quail, chukar, and mourning doves. The Carson wandering skipper, an endangered butterfly, was observed in Honey Lake Valley, California; East Alkali Flat, Nevada; and Winnemucca Valley, Nevada. Suitable habitat for this species is present at additional locations, but field surveys did not locate this butterfly other than at the three previously indicated locations.

MAMMALS

MULE DEER

Mule deer summer and winter habitats are present at the margins of the Study Area. Mule deer winter in the Sand Hills, Dogskin Mountains, and Fort Sage Mountains and occupy higher elevations of the Virginia Mountains during the summer. The Study Area is not part of major migration corridors (BLM 1993). Winter ranges in and near the Projects Area have been degraded by fires which have reduced sagebrush, bitterbrush (*Purshia tridentata*), and other fire-sensitive shrubs that provide winter browse.

PRONGHORN ANTELOPE

Pronghorn antelope generally range throughout the Study Area. In fall and winter they are closely associated with sagebrush communities, their primary forage source. Pronghorns disperse widely throughout the region in search of succulent forbs and grasses. The limiting factor that keeps pronghorn populations relatively low in the Study Area is scarcity of succulent forbs and grasses (BLM 1993).

BATS

Twenty-three species of bats are known to occur in Nevada of which 21 are BLM sensitive species. Based on information presented by the Nevada Bat Working Group (2002), Harvey *et al.* (1999), and Butts (2004) up to 16 BLM sensitive species could be present in the Projects Area. These 16 species have been documented for Washoe County and adjacent counties. They roost in caves, mine shafts, abandoned buildings, rock crevices, cliffs, and trees and forage in woodlands, over desert washes, and riparian areas. All species forage over water and drink from open water surfaces (e.g., stock tanks, ponds, lakes, springs and wetlands).

BIRDS

Raptors present in the Study Area include red-tailed hawk, turkey vulture, Swainson's hawk, prairie falcon, American kestrel, bald eagle, golden eagle, short-eared owls, burrowing owl, and great horned owl. These species, with the exception of burrowing owls, usually nest in trees, cliffs and rock outcrops. Red-tailed, ferruginous, and rough-legged hawks winter in the Study Area.

Other birds observed in the Study Area include western kingbird, Say's phoebe, horned lark, western meadow lark, black-throated sparrow, blue-gray gnatcatcher, common nighthawk, common raven, lark sparrow, lesser goldfinch potted towhee, western meadow lark, western scrub jay, loggerhead shrike, sage sparrow, Brewer's sparrow, and sage thrasher (Maxim 2004). These species nest and forage in grassland and shrub habitats.

The chukar is an introduced game bird that occupies steep terrain with perennial seeps and springs. Mourning doves nest in tall shrubs and trees, often in association with wetlands springs, and drainages. Sage grouse are obligately associated with sagebrush habitats in rolling hills and benches along drainages for nesting foraging and rearing young. Californian quail occupy riparian and sagebrush habitats with dense canopies, often in association with bitterbrush and other deciduous shrubs. All species of game bird in the Study Area visit surface water sources daily to drink. Availability of seasonal surface water is a critical factor limiting distribution and density of game birds.

Waterfowl and shorebirds nest and rest during migration at Honey Lake and associated wetlands. Several species of shorebirds and waterfowl also use seasonally flooded areas at playa lakes in eastern

Honey Lake Valley. In most years these lakes are dry by summer, but in exceptionally wet years, playa lakes may remain wet and provide nesting habitats for waterfowl and shorebirds.

AMPHIBIANS AND REPTILES

Detailed searches for amphibians and reptiles have not been conducted in the Study Area; however, incidental observations (Maxim 2004) indicate the northern desert horned lizard, western rattlesnake, western terrestrial garter snake, Great Basin collared lizard, Great Basin whiptail, long-nosed leopard lizard, Nevada side-blotched lizard, and northern desert horned lizard are present. Based on distribution maps (Stebbins 1985), the following reptiles and amphibians may be present in the Study Area: Great Basin spadefoot, western toad, Pacific tree frog, northern leopard frog, common collared lizard, sagebrush lizard, desert spiny lizard, western fence lizard, western skink, western whiptail, rubber boa, striped whipsnake, western yellow-bellied racer, western patch-nosed snake, ground snake, and night snake.

FISHERIES

In the Study Area, fish occur at High Rock Spring in eastern Honey Lake Valley. Tilapia were planted in the spring and they eliminated native species. Streams with reaches of perennial flow include Hay, Wilcox, and Cottonwood creeks. These creeks support small populations of native fish such as speckled dace (BLM 1993).

SPECIAL STATUS SPECIES

A species list for federally-listed and candidate species was received from the U.S. Fish and Wildlife Service (USFWS 2004) on March 16, 2004. Threatened, Endangered, Candidate, and BLM sensitive species known or with the potential to be present in or near the Study Area, or having suitable habitat present are listed in **Table 3-8**.

THREATENED AND ENDANGERED SPECIES

The bald eagle (threatened), Lahontan cutthroat trout (threatened), Cui-ui (endangered), and Carson wandering skipper (endangered) are species listed under the Endangered Species Act that occupy habitat or have potential to occupy habitat in or near the Study Area.

Bald Eagle

Bald eagles are present in the Study Area as transient visitors during spring and fall migrations and winter residents in Honey Lake Valley and other areas where permanent open water attracts waterfowl, an important food source for wintering eagles. Bald eagles also forage in upland sites for small mammals or feed on livestock or wildlife carrion. No bald eagle nests or roosts are known to occur in the Study Area.

TABLE 3-8
Status of Threatened, Endangered and BLM Sensitive Species that May Occur On or Near Projects Area

Species	Status	Habitat
Mammals		
Western small-footed myotis (*Myotis ciliolabrum*)	BLM sensitive; Documented from Washoe, Churchill, Pershing, and Douglas counties.	Forages along cliffs and rocky slopes and sometimes over water. Roosts/breeds in rock crevices, talus, caves, mine adits, abandoned buildings,
Big brown bat *(Eptisicus fuscus)*	BLM sensitive; Documented in Washoe, Churchill, Pershing, and Douglas counties	Roosts in caves, mine shafts, trees, bridges, and buildings; forages over water and in woodlands
Fringed myotis (*Myotis thysanodes*)	BLM sensitive; documented in Washoe, Pershing, and Churchill counties	Forages in desert scrub and pinon-juniper woodlands; breeds and roosts in mines, building, rock crevices, caves and under tree bark
California myotis (*Myotis californicus*)	BLM sensitive; Documented in Washoe, Churchill, and Pershing counties	Roosts in caves, crevices , talus, trees, bridges, and buildings; forages over water, and in desert washes, and woodlands
Little brown myotis (*Myotis lucifugus*)	BLM sensitive; Documented in Washoe and Churchill counties	Prefers to forage over water. Usually hibernates in caves and mines, often roosts and breeds in buildings.
Western long-eared myotis *(Myotis evotis)*	BLM sensitive; Documented in Washoe and Churchill counties	Roosts in trees, caves, buildings, under bridges, crevices; forages over water and in woodlands
Yuma myotis *(Myotis yumanensis)*	BLM sensitive; Documented in Washoe, Churchill, Pershing, and Douglas counties	Roosts in trees, caves, mine shafts, cliffs, crevices, abandoned buildings, and under bridges; forages over water
Long-legged myotis *(Myotis volans)*	BLM sensitive; Documented in Washoe, Churchill, Pershing, and Douglas counties	Roosts in trees, caves, mine shafts, cliffs, crevices, abandoned buildings, and under bridges; forages over water
Hoary bat *(Lasiurus cinereus)*	BLM sensitive; Documented in Washoe and Churchill counties	Roosts in trees, cliffs, mines, caves, and talus; forages over water and in woodlands
Pallid bat *(Antrozous pallidus)*	BLM sensitive; Documented in adjacent Churchill and Pershing counties	Roosts in cave, mine shafts, bridges, buildings, and trees; forages in woodlands, over water, and desert washes
Spotted bat *(Euderma maculata)*	BLM sensitive; Documented in Washoe County	Roosts in caves, crevices , talus, trees, bridges, and buildings; forages over water, and in desert washes, and woodlands
Silver-haired bat *(Lasionycteris noctivagans)*	BLM sensitive; Documented in Washoe, Churchill, and Pershing counties	Roosts in trees, caves, mine shafts, bridges, and buildings, and forages over water and in woodlands
Western red bat *(Lasiurus blossevillii)*	BLM sensitive; Documented in Washoe and Churchill counties	Roosts in trees; forages over water and in woodlands
Spotted bat (*Euderma maculatum*)	BLM sensitive; Documented in Washoe County	Low deserts to montane forests with rock outcrops and cliffs. Forages over water and among trees
Townsend's big-eared bat (*Corynorhinus townsendii*)	BLM sensitive; Documented in Projects Area and adjacent Churchill and Pershing counties	Roosts and breeds mines, caves, and under bridges; returns yearly to same roost sites.
Western pipistrelle *Pipistrellus hesperus*	BLM sensitive; Documented in Washoe, Churchill, Pershing, and Douglas counties	Roosts in trees, caves, abandoned buildings, and under bridges; forages over water and desert washes, and in woodlands

TABLE 3-8 (continued)
Status of Threatened, Endangered and BLM Sensitive Species that May Occur On or Near Projects Area

Species	Status	Habitat
Brazilian free-tailed bat *(Tadaria braziliensis)*	BLM sensitive: Documented in Washoe and Churchill counties	Roosts in trees, caves, abandoned buildings, and under bridges; forages over water and desert washes, and in woodlands
Pygmy rabbit (*Brachylagus idahoensis*)	BLM sensitive; Not documented in Projects Area, but suitable habitat is present.	Relatively tall, dense big sagebrush communities with deep soils suitable for establishing burrows
Preble's shrew (*Sorex preblei*)	BLM sensitive, not documented in Projects Area, but suitable habitat may be present	Sagebrush, grassland, riparian habitats and marshy areas
Birds		
Bald eagle (*Haliaeetus leucocephalus*)	Threatened/BLM sensitive, may occasionally be present in Projects Area during winter.	Periodic seasonal migrant in winter, present near open water where favored prey (waterfowl and fish) are present or where carrion is available. Common winter visitors around Honey Lake Valley.
Sage grouse (*Centrocercus urophasianus*)	BLM sensitive; two leks present in vicinity of proposed rights-of-way; not active in 2004	Sage brush habitat and wet meadows and riparian areas for brood rearing
Northern goshawk (*Accipiter gentilis*)	BLM sensitive, not known to nest in Projects Area; Suitable nesting habitat not present.	Nests in aspen stands, usually near streams
Ferruginous hawk (*Buteo regalis*)	BLM sensitive; Not known to nest in Projects Area, rarely nests in western Nevada. Limited potential nesting in Project Area.	Prefers to nest at interface of pinon-juniper zone and desert shrub communities
Swainson's hawk (*Buteo swainsoni*)	BLM sensitive; Limited nesting habitat present in Projects Area.	Nests in deciduous trees and shrubs in riparian areas or around springs
Burrowing owl (*Athene cunicularia hypugaea*)	BLM sensitive; Not known to nest in Projects Area, but habitat may be present	Nests in grasslands and shrublands, often in association with ground squirrels and badgers, which excavate burrows it uses for nesting
Western snowy plover (*Charadrius alexandrinus nivosus*)	BLM sensitive; Habitat present in around Honey Lake and other playas.	Shorelines of alkaline lakes and playas
Black tern (*Chlidonias niger*)	BLM sensitive; Habitat present near Projects Area in the Honey Lake Valley	Freshwater marshes and sloughs
Western yellow-billed cuckoo (*Coccyzus americanus occidentalia*)	BLM sensitive/ federal candidate for listing; Habitat not present in Projects Area	Riparian woodlands with dense thickets of shrubs and trees
Flammulated owl (*Otus flammeolus*)	BLM sensitive, nesting and foraging habitat not present in Projects Area	Mountain pine forests
White-faced ibis (*Plegadis chihi*)	Proposed BLM sensitive; nesting and foraging habitat present in wetlands at Honey Lake; wetlands near Projects Area not large enough to support breeding	Large wetlands and riparian areas with emergent vegetation
Mountain quail (*Oreortyx pictus*)	BLM sensitive; not present in the Projects Area.	Conifer forest, chapparal, and pinon-juniper woodlands
Reptiles		

TABLE 3-8 (continued)
Status of Threatened, Endangered and BLM Sensitive Species that May Occur On or Near Projects Area

Species	Status	Habitat
Sierra alligator lizard (*Elgaria coerulea palmeri*)	BLM sensitive; documented in Washoe County	Generally inhabits woodland and forest, but occasionally found in grassland and sagebrush habitats
Fish		
Lahontan cutthroat trout (*Onchorynchus clarki henshawi*)	Threatened/BLM sensitive; not present in Projects Area. Present in Pyramid Lake and the Truckee River	Lake dwelling trout that spawns in flowing fresh water
Cui-ui (*Chasmistes cujus*)	Endangered/BLM sensitive; not present in Projects Area. Endemic to Pyramid Lake, spawning in the Truckee River	Lake dwelling sucker that spawns in flowing fresh water
Invertebrates		
California floater (*Anodonta californiensis*)	BLM sensitive, not present in Projects Area	Rivers with fish
Fly Ranch Springsnail (*Pygulopsis bruesi*)	BLM sensitive; not present in Projects Area	Fly Ranch thermal springs near Gerlach, Nevada
Carson wandering skipper (*Pseudocopaedodes eunus obscurus*)	Endangered/BLM sensitive; present near Honey Lake; currently known from three populations: Carson City, NV, Winnemucca Valley, NV and Honey Lake Valley, CA. A single Carson wandering skipper was observed at East Alkali Flat, NV (Sanford 2004a). Suitable Carson wandering skipper habitat is present near Fish Springs Ranch, Smoke Creek Desert, Bedell Flat, and Dry Valley (Sanford 2004a).	Feeds on flower nectar and lays eggs exclusively on salt grass. Larvae feed on salt grass.
Carson valley silverspot (*Speyeria nokomis carsonensis*)	BLM sensitive; species not observed/identified during surveys of Projects Area (Sanford 2004b).	Once present along the Carson River in Douglas County; currently restricted to a small population in Douglas County
Mono checkerspot (*Euphydryas editha monensis*)	BLM sensitive; documented in Washoe County; species not observed/identified during surveys of Projects Area (Sanford 2004b).	Riparian habitats on east side of Sierra Nevada Range; distribution centered in Mono County, California
Carson valley wood nymph *(Cercyonis pegala carsonensis)*	BLM sensitive; species not observed/identified during surveys of suitable habitat in Projects Area (Sanford 2004b).	Wetlands and riparian areas; requires grasses or sedges as host plants; little is known about its ecology (Sanford 2004b).

Source: Harvey *et al.* 1999; Erhlich *et al.* 1988; Sibley 2001; Nevada Bat Working Group 2002; Herron *et al.* 1985; Nevada Natural Heritage Program 2004; Sanford 2004a, 2004b.

Lahontan Cutthroat Trout

Lahontan cutthroat trout inhabit Pyramid Lake and spawn in the Truckee River. The original strain of Pyramid Lake Lahontan cutthroat trout became extinct in the 1940s due to diversions for the Truckee River (Sigler and Sigler 1979). Lahontan cutthroat trout were re-established in Pyramid Lake through hatchery propagation of strains from Summit, Walker, and Heenan lakes. The Derby Dam is a barrier to upstream spawning runs of Lahontan cutthroat trout. No Lahontan trout or their habitat are present in the Study Area outside of Pyramid Lake.

Cui-ui

The Cui-ui is a large plankton-feeding, lake-dwelling sucker that traditionally spawned in the Truckee River in shallow gravel beds. Populations of cui-ui have declined through disruption of their reproductive cycle due to reduce flows in the Truckee River and declining water levels in Pyramid Lake resulting from water diversions. In some years, river flow has been insufficient to allow passage of Cui-ui to spawning sites (BLM 1993). Cui-ui live more than 40 years, which has allowed the species to persist for many years with sporadic reproduction and recruitment to the population.

Carson Wandering Skipper

The Carson wandering skipper, a small orange butterfly, is known from three viable populations: Honey Lake Valley, California; Winnemucca Valley, Nevada; and near Carson City, Nevada. The Carson wandering skipper feeds on nectar from flowers and lays its eggs on salt grass, the obligate host of the butterfly's larvae (Brussard *et al.* 1999). Salt grass typically is present where their roots are inundated with water for short periods.

Potential habitat (i.e., salt grass and nearby nectar-producing flowers) for Carson wandering skipper appears to be present in the Study Area: six areas in Honey Lake Valley, two sites in Dry Valley, and two sites in Bedell Flat (**Figure 3-7**). An additional potential habitat site in Smoke Creek Desert is included on **Figure 3-7** because of its proximity to Fish Springs Ranch. Three of the potential habitat sites (Wendell Flowing Well, South Alkali Flat, and Lower Dry Valley) have vegetation supported by flow from springs (Sanford 2004a).

A single Carson wandering skipper was observed at East Alkali Flat, in eastern Honey Lake Valley, Nevada (near Fish Springs Ranch); and three skippers were observed at South Bay, Honey Lake (**Figure 3-7**). It is not known, however, if these locations support temporary Carson wandering skipper populations rather than long-term viable populations (Sanford 2004a).

The Carson wandering skipper also has been observed in the Winnemucca Valley near Winnemucca Ranch Road, located south of Dry Valley and east of Bedell Flat. The location in Winnemucca Valley has been designated as an Area of Critical Environmental Concern (ACEC) because it supports the Carson

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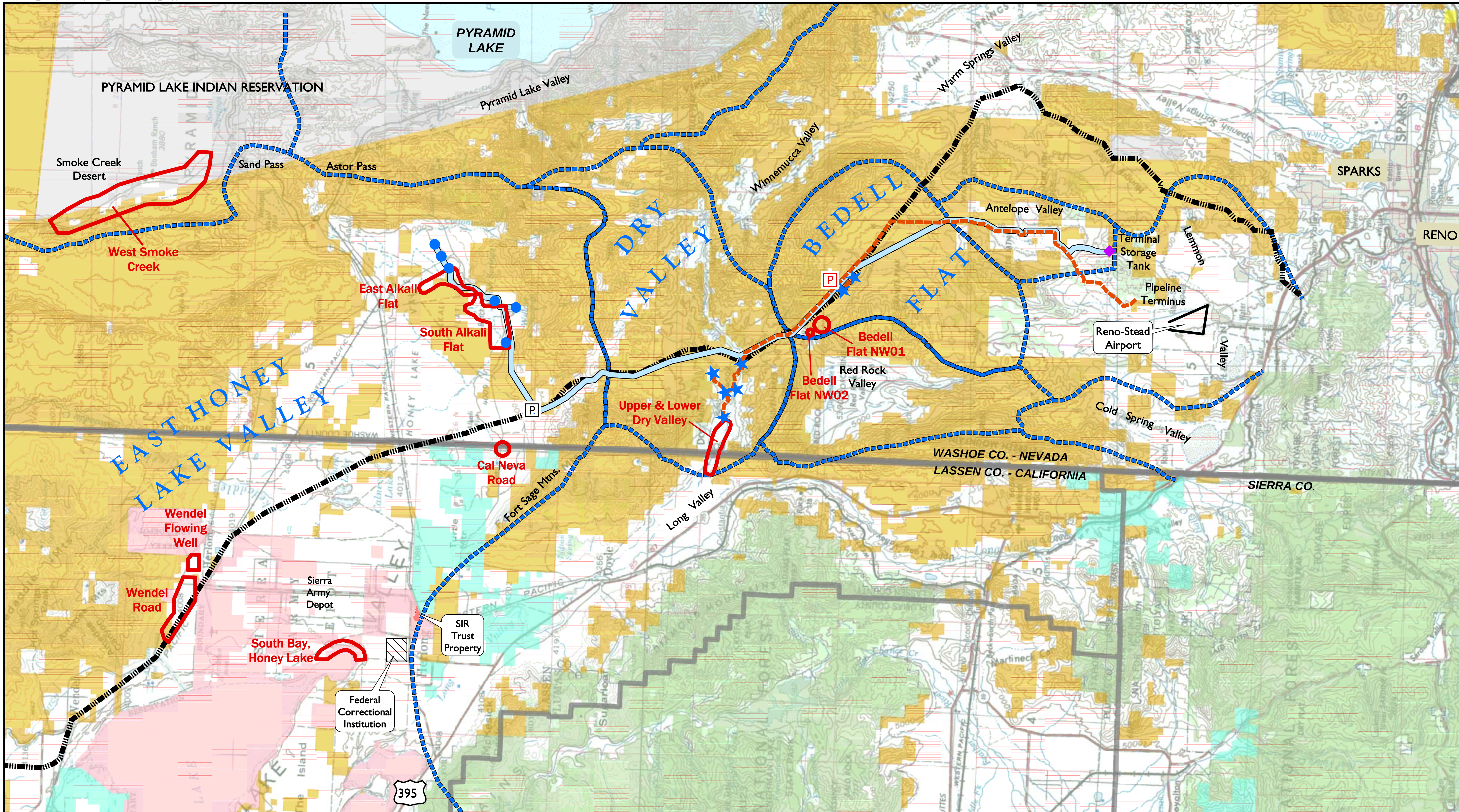


Note: Data for Nevada are from the Bureau of Land Management Geographic Information System database.

0 Miles 5

Intermountain Water Supply, Inc.

- Proposed Pump Station
- Proposed Production Well
- Proposed Pipeline Route

Fish Springs Ranch, LLC

- Proposed Terminal Tank
- Proposed Production Well
- Proposed Pump Station
- Proposed Pipeline Route

Public Ownership

- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Department of Defense (Sierra Army Depot)
- Forest Service
- State of California
- Susanville Indian Ranchera (SIR)

- Tuscarora Natural Gas Pipeline
- Watershed Boundary
- Potential Habitat for Carson Wandering Skipper

Carson Wandering Skipper Potential Habitat
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 3-7

wandering skipper and has potential to provide important habitat to support viable populations of this species. BLM is acquiring private land, contiguous with public land, to protect Carson wandering skipper habitat in the Winnemucca Valley. Current threats to the Winnemucca Valley population include encroaching development and drawdown of the water table from an increased number of domestic wells (Brussard *et al.* 1999).

Sanford (2004b) also surveyed the Study Area for two special status butterfly species: Carson Valley wood nymph and Carson Valley silverspot. These butterfly species, however, were not found during the August 2004 survey.

SENSITIVE SPECIES

The following section addresses only sensitive species that are known or may be present in the Study Area.

Bats

Most of the bat species listed in **Table 3-8** have the potential to use habitats of the Study Area for foraging, roosting, and breeding. Wetlands and water associated with springs and seeps, sagebrush grasslands, juniper woodlands, and rocky outcrops may provide habitat for some or all bat species listed as sensitive in **Table 3-8.** Rock crevices may provide roosting habitat and marginal breeding habitat. Caves, mines, and abandoned buildings optimum for roosting and breeding for colonies of bats have not been documented in the Study Area.

Water sources are critical to bats because they drink from open water, and insects are more abundant around wetlands and open water. Studies in desert habitats have found that bat activity is 40 times greater near wetlands and riparian areas than in upland areas (Nevada Bat Working Group 2002). Even high-elevation tree roosting bats fly to open water, wetlands, and riparian areas to drink and forage.

Species of bats with potential to occupy habitat in the Study Area vary in the degree to which their populations and habitats are at risk. According to the Nevada Bat Working Group (2002), species at high risk are the fringed myotis, western red bat, and Townsend's big eared bat (**Table 3-9**).

Pygmy Rabbit

Pygmy rabbits prefer areas of relatively tall, dense sagebrush with deep soil suitable for excavating burrows. Sagebrush is the primary food of pygmy rabbits, but they also eat grasses and forbs depending on the seasonal availability. In Nevada, pygmy rabbits are generally found in sagebrush-dominated broad valley floors, stream banks, alluvial fans, and other areas with friable soil. Surveys conducted on public land in the Study Area for pygmy rabbits, pygmy rabbit burrows, and fecal deposits did not find indications that they are present (Maxim 2004)

Preble's Shrew

The ecology, life history, and habitat characteristics of Preble's shrew are poorly known (Foresman 2001; Clark and Stromberg 1987); however, over its range, it has been found mostly in sagebrush and grassland habitats and occasionally in coniferous forest, marshes, and riparian areas. Suitable habitat appears to be present in the Study Area and the species has been documented to be present in Washoe County (Nevada Natural Heritage Program 2004).

Sage Grouse

Sage grouse forage and nest in the Study Area. Sage grouse are obligately linked to sagebrush which is their primary food in fall and winter. In spring and summer, sage grouse also feed on herbaceous vegetation and insects. Wetland and riparian areas are important brood-rearing areas for sage grouse. In spring sage grouse visit communal courtship areas known as leks for breeding. Two historic leks are located Bedell Flat; however, these leks were inactive in 2004 (Espinosa 2004). Sage grouse have also been documented in the Sand Hills and Virginia Mountains, on the margin of the Study Area (BLM 1993). Fires have greatly reduced sage grouse habitat in the Study Area. Fires, in conjunction with the scarcity of mountain meadow habitat for chick rearing, are the major factors limiting sage grouse populations in the Study Area.

TABLE 3-9
Conservation Status of Bats Potentially Present in Study Area

Species	Populations/Habitats at Risk
Pallid bat	Moderate
Townsend's big-eared bat	High
Big brown bat	Low
Spotted bat	Moderate
Silver-haired bat	Moderate
Western red bat	High
Hoary bat	Moderate
California myotis	Moderate
Small-footed myotis	Moderate
Long-eared myotis	Moderate
Little brown myotis	Moderate
Fringed myotis	High
Long-legged myotis	Low
Yuma myotis	Moderate
Western Pipistrelle	Moderate
Brazilian free-tailed bat	Low

Source: Nevada Bat Working Group 2002.

Swainson's Hawk

Swainson's hawks are seasonal residents and nesters in the Study Area, migrating to South and Central America in winter (Ryser 1985). This hawk nests in clumps of trees, often in agricultural and riparian areas or near springs. Swainson's hawks feed mostly on large insects and small mammals; however, they will also take bats, birds, and amphibians. This hawk is present in Honey Lake Valley and may nest in cottonwood trees near ranches and scattered juniper trees in the southern part of the valley (BLM 1993).

Burrowing Owl

Burrowing owls nest in underground burrows excavated by ground squirrels, badgers, and other mammals; however, they are also able to excavate their own burrows. They usually occupy sagebrush and grassland habitats. The same nesting burrow may be used for a number of years. Although burrowing owls can often be seen perched on or near their burrow during the day, they forage at night for nocturnal small mammals, spadefoot toads, and insects. Burrowing owls usually migrate south from Nevada in winter, but there are records of them over-wintering in their burrows in a state of torpor (Ryser 1985).

Black Tern

Black terns feed mainly on insects and require dense emergent vegetation in freshwater marshes and wetlands for nesting (Erlich *et al.* 1988). It nests in Honey Lake Valley in extensive wetlands at the north end of Honey Lake. Nesting habitat for black terns may also be present at Bonham Ranch in Smoke Creek Desert and Spanish Springs Valley, but no nesting terns have been confirmed (BLM 1993).

Western Snowy Plover

Populations of the western snowy plover breed at shallow alkaline lakes and playas in the interior West including Honey, Duck, and Calneva lakes near the Study Area. They nest on sparsely vegetated shorelines on alkaline sand and gravel. There appears to be little potential for plover nesting habitat within the Study Area (BLM 1993).

ACCESS AND LAND USE

The area to be traversed by the proposed water transmission pipelines between Lemmon Valley in the south and eastern Honey Lake Valley in the north is public land administered by BLM. Small private tracts occur in Dry Valley and northeastern Red Rock Valley (adjacent to Bedell Flat). The proposed Fish Springs Ranch pipeline would cross Fish Springs Ranch which owns land along the north flank of Fort Sage Mountains. Principal access routes to the proposed pipeline alignments would be via the pump station in the north, U.S. Highway 395 and Red Rock Road from the west, Winnemucca Ranch Road from the east, and Lemmon Valley Drive and Antelope Valley Road from the south **(Figure 2-1)**. Road designations, routes, and land tracts encompassing the Proposed Projects described above constitute the Study Area for *Access and Land Use.*

NORTH VALLEYS AREA PLAN

The North Valleys Area Plan encompasses approximately 152,240 acres, of which 14,385 acres have been developed. The prospect for additional suburban development in the Plan area is limited because groundwater resources are appropriated (Washoe County Department of Community Development 2003). Any proposed subdivisions would need to obtain water rights from elsewhere or secure rights to conservation surpluses in order to be approved.

Land use in Lemmon Valley consists of low- and medium-density suburban development (one to three dwelling units per acre), and low- and medium-density rural (one dwelling unit per 5 to 10 acres). Antelope Valley is an established area designated as low density rural residential (one dwelling unit per 10 acres).

Industrial and commercial development in the area encompassed by the North Valleys Area Plan is generally located along the U.S. Highway 395 corridor. Conversion of residential to industrial land uses south of Stead, between U.S. 395 and Old U.S. 395 is also occurring.

Reno-Stead Airport encompasses 760 acres and is the major industrial land use in the North Valleys Area Plan area. The airport currently functions as a regional general aviation airport and is also used by the Nevada Army National Guard. Existing facilities include two runways, numerous hangars, air tanker services, control tower, and support facilities (Jeff Codega Planning Design, Inc 2000). The Airport Authority of Washoe County owns approximately 5,045 acres (within the City of Reno boundary) surrounding the Reno-Stead Airport and plans to develop land based on Industrial zoning with a variety of non-residential mixed uses allowed.

At present, there is low demand for the commercial or industrial space at Reno-Stead Airport (Schultz 2004). The 2002 Truckee Meadows Regional Plan, as amended February 2003, notes that Stead is anticipated to become a regional and major employment center. A Regional Center Plan for Stead is currently in place.

HIGH DESERT PLANNING AREA

The High Desert Planning Area adjoins the areas included in the North Valleys Area Plan on the north and comprises 4,408 square miles in the northern two-thirds of Washoe County. Predominant land use in the High Desert Planning Area is designated as general rural and includes over 2.6 million acres of public land used for open space, agriculture, and grazing. General rural designation includes public land, land with severe development constraints, land that should be preserved for conservation purposes, or land that is not planned to receive services and facilities needed for development.

The California-Nevada state line bisects Honey Lake Valley. The Nevada portion lies in the southernmost extension of the High Desert Planning Area. Land use in the area is primarily agriculture and grazing. Residential dwelling units are generally one per 40 acres. The U.S Army operates the Sierra Army Depot on the California side of Honey Lake Valley. The Depot is used for storage and disposal of ammunition. A Federal Correction Institution and Doyle Wildlife Range are also located in the California portion of Honey Lake Valley.

BLM AUTHORIZATIONS

Land use authorizations, rights-of-way, or other improvements in the Study Area are listed in **Table 3-10.** These include access roads, natural gas pipeline and electrical distribution powerline rights-of-way, and a water transmission pipeline right-of-way.

GRAZING MANAGEMENT

The proposed pipeline rights-of-way would cross all or portions of five grazing allotments. Allotment names, number, area, permitted animal unit months (AUMs), schedule, and permittees are shown in **Table 3-11.**

RECREATION

Dispersed, undeveloped recreation is the predominant type of outdoor recreation in the Study Area. The Study Area for recreation encompasses the same land tracts, roads, and routes described previously in *Access and Land Use*. These areas are mostly public land administered by BLM and frequently used for organized and dispersed recreational activities.

The general area provides open space for diverse recreational activities such as hunting, hiking, mountain biking, horseback riding, and off-highway vehicle (OHV) use. Recreational shooting occurs at several locations and is not specifically restricted. Other users of the area must be vigilant in areas used for target and skeet shooting (BLM 2001b). OHV use is the most popular form of recreation in the Study Area due to its proximity to the Reno-Sparks metropolitan area and the network of roads and trails throughout the mountains and valleys.

Dispersed, non-motorized, and semi-primitive recreational opportunities are located in Petersen Mountain, Red Rock Scenic Area, Fred's Mountain, Pah Rah Range, and Incandescent Rocks Area of Critical Environmental Concern (ACEC) in the Virginia Mountains.

TABLE 3-10 Rights-of-Way Within or Adjacent to Projects Area					
SERIAL NUMBER	HOLDER	TYPE	LOCATION	DIMENSION (FEET)	
				LENGTH	WIDTH
Fish Springs Ranch Application N-76800					
N-28605	Red Rock Estates	Road	Sections 1, 2 T22N, R19E	Varying by section	66 ft.
N-57450	Tuscarora Gas Co.	Natural Gas Pipeline	Sections. 4, 5, 9, 10, T23N, R19E	Varying by section	100 ft.
N-28605	Red Rock Estates	Road	Section 36, T23N, R19E	2024 ft.	66 ft.
N-57450	Tuscarora Gas Co.	Natural Gas Pipeline	Sections 1, 12, 13, 24, T24N, R18E	Varying by section	100 ft.
N-57450	Tuscarora Gas Co.	Natural Gas Pipeline	Sections 19, 30, 31, 32, T24N, R19E	Varying by section	100 ft.
N-57450	Tuscarora Gas Co.	Natural Gas Pipeline	Sections. 3, 4, 10, 14, 23, 26, 35, 36, T25N, R18E	Varying by section	100 ft.
N-27350	Sierra Pacific Power Co.	Electric Transmission Line	Sections. 3, 4, 14, 23, T25N, R18E	Varying by section	Varying
N-42346	Fish Springs Ranch	Water Pipeline	Section 26, T26N, R18E	3,000 ft.	12 ft.
N-51491	Fish Springs Ranch	Well Site/Access Road	Section 26, T26N, R18E	Well Site: 130 ft. Road: 500 ft.	Well Site: 70 ft. Road:15 ft.
Intermountain Water Supply Application N-76897					
N-57450	Tuscarora Gas Co.	Natural Gas Pipeline	Sections 13, 24 T24N, R18E	Varying by section	100 ft.
N-34321	J. and C. Richardson	Access Road	Section 8, E½ NE¼, T21N, R19E	1,460 ft.	50 ft.
N-28605	Red Rock Estates	Access Road	Section 36, T23N, R19E	2,024 ft.	66 ft.
N-57450	Tuscarora Gas Co.	Natural Gas Pipeline	Sections 4, 5, 9, 10, 11, 13, 14, T23N, R19E	Varying by section	100 ft.
N-57450	Tuscarora Gas Co.	Natural Gas Pipeline	Sections 19, 30, 31, 32, T24N, R19E	Varying by section	100 ft.

Source: Nelson 2004.

TABLE 3-11 Grazing Allotments in Study Area				
Allotment	Area (acres)	Animal Unit Months	Grazing Season	Permittee
Antelope Mountain #3001	53,755	6,362	April 15 – Oct. 31	D.S. Ranches Fernley, NV
Constantia #3012	19,121	1,246	April 1 – Nov. 30	Mapes Ranch Standish, CA
Flanigan #3022	56,079	3,815	Dec. 1 – Sept. 30	Fish Springs Ranch Carson City, NV
Red Rock #3014	3,560	454	April 15 – Oct. 31	D.S. Ranches Fernley, NV
Winnemucca Ranch #3059	43,457	3,483	June 1 – Oct. 31	Winnemucca Ranch Reno, NV

Source: Nelson 2004.

Organized events on public land require coordination with BLM and issuance of a Special Recreation Permit. Therefore, location and timing of events is often planned to minimize user conflict and to manage impact of those activities on the environment.

The following organized recreational activities occur on public land administered by BLM within the Study Area or in the vicinity of the proposed pipeline rights-of-way:

- Motorcycle races occur approximately four to six times per year at the Lemmon Valley Motocross Track at the north end of Lemmon Valley. The Hungry Valley OHV Area encompasses about 40,000 acres and hosts two to three motorcycle races a year.

- Hunting dog field trials occur during spring and fall in Hungry Valley and in the Cold Springs area. Approximately 20 to over 100 participants compete at the field trials. Dog trials require large tracts of unobstructed land, and participants use horses to cover distances with the dogs.

- Equestrian events in the vicinity of the Projects Area include four to six organized endurance races each year. These events cover 100 miles and include portions of the Projects Area.

- The Red Rock Hounds, Inc. conduct English style "fox" hunts (except they chase coyotes) from mid-September through March in the Sand Hills, Bedell Flat, and Hungry Valley areas. These chases require large open areas where participants run little risk of conflicting with other activities; particularly motorized sports. Organized coyote chasing may include over 100 participants with horses and dogs.

- During June, the Reno Rodeo Cattle Drive goes from Doyle, California through Dry Valley, Bedell Flat, and Hungry Valley to Reno, Nevada (Knight 2004).

The Reno-Stead Airport has been the site of National Championship Air Races and Air Show since 1965. The show is staged annually in September and draws over 200,000 visitors and spectators (BLM 2003).

HUNTING

Hunting in the Study Area is within NDOW Unit 021 of Area 2. Mule deer hunting in Unit 021 occurs over a 3-week period in December with a 1-week season for pronghorn antelope in late August and early September. In 2003, 20 permits for mule deer and 13 permits for pronghorn antelope were issued in Unit 021. Hunter success ranged from 55 percent for mule deer to 69 percent for pronghorn antelope.

Hunting of quail and chukar extends from mid-October through January. Hunting Unit 021 is closed to hunting of sage grouse.

NOISE

Ambient noise of a given environment is the all-encompassing sound associated with that environment, and is due to a combination of noise sources from many directions - near and far. Existing ambient noise levels in the Study Area are a combination of noise due to animals, insects, human activities, vehicles, and aircraft. The Study Area for noise includes areas within normal hearing distance of the proposed pipeline rights-of-way and associated components. Existing ambient noise levels in the Study Area are typical for a rural setting.

Typical existing day-night average noise level (L_{dn}) in residential areas, such as Lemmon and Antelope valleys, range between 40 and 45 dBA, similar to levels for typical rural residential areas. In quiet areas, with limited activities, such as sparsely developed areas in Honey Lake Valley, Dry Valley, and Bedell Flat, ambient noise levels would likely range between 30 and 40 dBA. **Table 3-12** shows typical outdoor ambient noise levels for several types of residential areas.

The L_{dn} is a single number descriptor that represents constantly varying sound level during a continuous 24-hour period. The L_{dn} includes a 10 dBA penalty added to noise occurring between 10:00 p.m. and 7:00 a.m. The penalty is used to account for increased annoyance caused by noise levels at night. The *1996 Washoe County Development Code, Article 414–Noise and Lighting Standards* determines maximum allowable noise levels in terms of L_{dn} values. **Table 3-13** summarizes applicable maximum noise levels allowed by Washoe County Code.

Noise generated by trucks, bulldozers, and other equipment generally ranges from 90 to 100 dBA at the source. For comparison **Table 3-14** lists various noise sources and the range of dBA associated with these noises.

VISUAL RESOURCES

Objectives of the visual resource investigation are to identify and describe visual resources that could be affected by the proposed pipeline rights-of-way and associated structures. Visual resources include landscapes that may be viewed during activities such as travel and recreation. The Study Area for visual resources is defined by location of Key Observation Points (KOPs) and resultant viewsheds as selected through BLM's Visual Resources Management system guidance.

TABLE 3-12
Typical Outdoor Ambient Noise Levels

Approximate L_{dn}	Description
55-60 dBA[1]	Urban residence
45-50 dBA	Suburban residence on outskirts of city
45-50 dBA	Small town residence
40-45 dBA	Rural residence
30-40 dBA	Undeveloped or sparsely developed land

[1] dBA = A-weighted decibel sound scale

Source: Handbook of Acoustical Measurements and Noise Control 1998.

TABLE 3-13
Washoe County Maximum Allowable Noise Levels

Condition	Allowable L_{dn} at Property Line	Description
A	75 dBA	Industrial development within an industrial zone.
B	65 dBA	Property abutting residential development.
C	65 dBA	Property abutting public/quasi-public facilities, such as parks, schools, hospitals, and group and child care facilities.

Source: Washoe County Development Code 1996.

TABLE 3-14
Relative Scale of Various Noise Sources

Noise Level (dBA)[1]	Common Indoor Noise Levels	Common Outdoor Noise Levels
110	Rock band	
105		Jet flyover @ 1000 feet.
100	Inside New York subway train	
95		Gas lawn mower @ 3 feet.
90	Food blender @ 3 feet	
80	Garbage disposal @ 3 feet., Shouting @ 3 feet	Noisy urban daytime
70	Vacuum cleaner @ 10 feet	Gas lawn mower @ 100 feet.
65	Normal speech @ 3 feet	Commercial area, heavy traffic @ 300 feet.
60	Large business office	
50	Dishwasher in next room	Quiet urban daytime
40	Small theater, large conference room	Quiet urban nighttime
35		Quiet suburban nighttime
33	Library	
28	Bedroom @ night	
25	Concert hall (background)	Quiet rural nighttime
15	Broadcast and recording studio	
5	Threshold of hearing	

[1] dBA = A-weighted decibel sound scale.

Source: Hatano 1980.

The proposed water transmission pipelines would extend from southeastern Honey Lake Valley and central Dry Valley in the north through Bedell Flat and Antelope Valley to the south. This area consists of north-south trending mountain ranges from 4200 feet amsl at valley floor to over 7000 feet amsl at ridgeline. Sparsely vegetated hills of sagebrush and dry valleys in varying shades of tan and beige characterize the area. At higher elevations, juniper trees color the landscape with darker shades of green. Dry washes meander through the Study Area. Sandy soil and rock are exposed in all areas due to sparse vegetation. Surface color ranges from light tan to darker shades of tan or beige. Vegetation colors range from tan to green (seasonal).

The proposed Projects can be viewed from several different locations and angles. Most locations are lightly traveled recreation trails or ranch roads that extend through the valleys. The most notable exception would be the pipeline terminus areas that can be viewed at distance from U.S. Highway 395.

VISUAL RESOURCE MANAGEMENT SYSTEM

BLM has developed a Visual Resource Management (VRM) system to classify visual resources based on scenic quality, visual sensitivity, and visual distance zones. **Table 3-15** lists management classes and various permissible levels of landscape alteration under the VRM system. Management classes are categorized into four levels (I through IV), with Class IV allowing the greatest modification of the landscape by disturbance or development. VRM classes and associated resources management objectives only apply to public land administered by BLM.

Public land located along the proposed rights-of-way routes is entirely within areas assigned to VRM Classes III and IV. Bedell Flat is one of few remaining undeveloped valleys north of Reno and is assigned to VRM Class IV. Multiple dirt roads and stock tanks are existing visible intrusions.

The KOPs were established for evaluating visual contrasts. Factors considered in selecting these views included angle of observation, number of viewers, duration of view, relative apparent size of the Projects, season of use, and lighting conditions. Three KOPs were selected and evaluated to represent locations on roads approaching the Projects Area from which a person may be expected to view Project features (**Figure 3-8**). Selected KOP views for the proposed Projects are shown on **Figures 3-9** and **3-10**.

KOP-1 is located at the intersection of the existing Tuscarora Natural Gas Pipeline and Fish Springs Ranch Road. This is a 1.5-mile southern view of the Fish Springs Ranch pump station, storage tanks, and Sierra Pacific Power Company's electrical substation.

KOP-2 is located on Matterhorn Boulevard at the high point between Antelope and Lemmon Valleys. This is a drive-by view of the proposed Fish Springs Ranch terminal storage tank located several hundred feet and slightly uphill to the east.

TABLE 3-15 Visual Resource Management Objectives	
Class	**Objective**
I	Objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes, it does not preclude limited management activity. The level of change to the characteristic landscape should be low and must not attract attention.
II	Objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color and texture found in the predominant features of the characteristic landscape.
III	Objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant features of the characteristic landscape.
IV	Objective of this class is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. The impacts of these activities should be minimized through careful location, minimal disturbance and repetition of the basic elements.

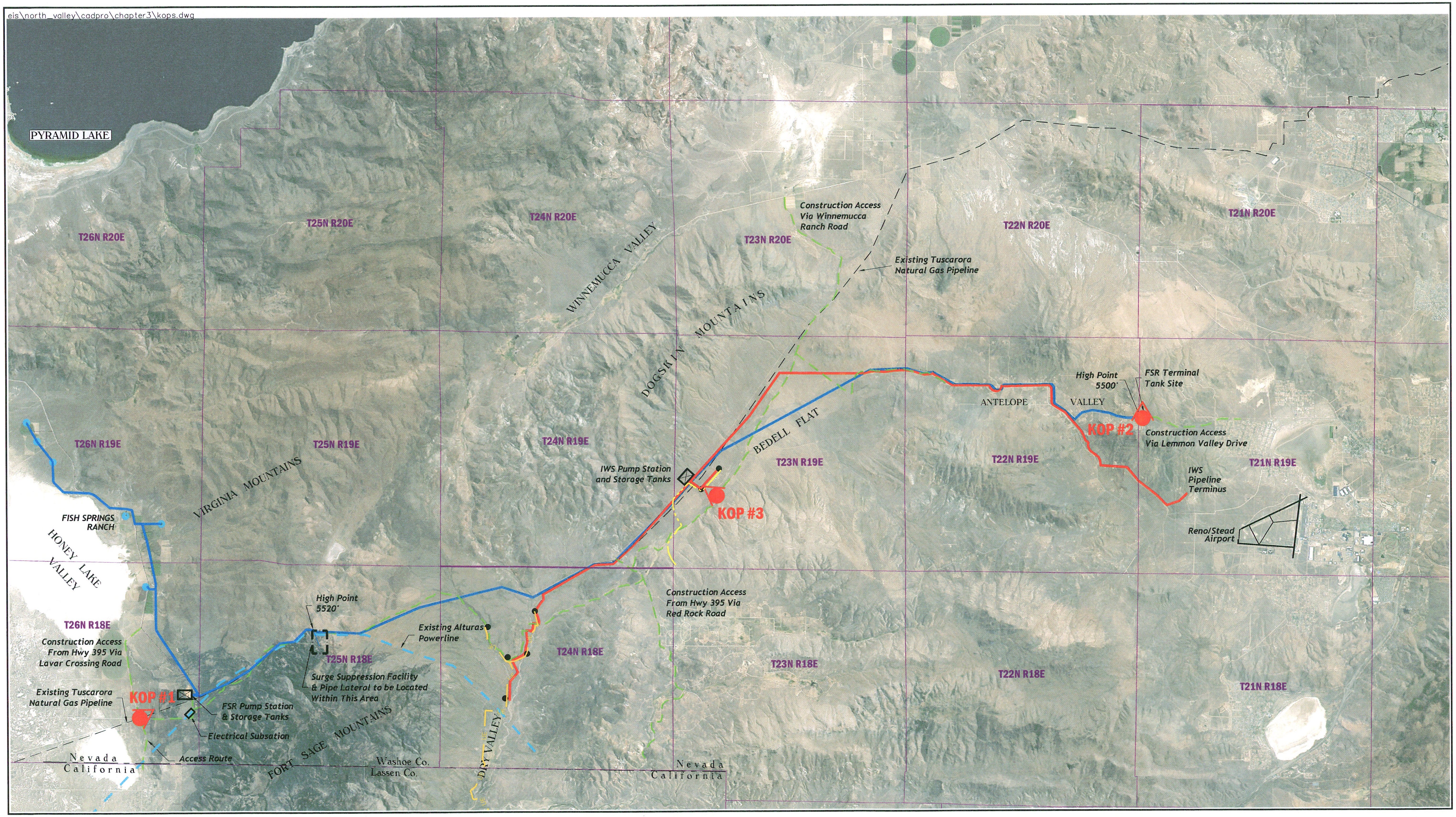
Source: BLM 1986.

KOP-3 is located on the main road through Bedell Flat at the access point to Intermountain Water Supply well BF-1 and pump station. This is a flat cross-valley view of the pump station storage tanks.

SOCIAL AND ECONOMIC RESOURCES

The Study Area for population, demographics and housing is Washoe County. The county covers 6,342 square miles in the northwest section of the state bordering California and Oregon. Reno, the county seat, is the largest city in northern Nevada, covering 56 square miles in the southern part of Washoe County. Reno was incorporated in 1903 and is governed under a council-manager form of government. The proposed Rights-of-Way Projects are located in an area encompassed by the North Valleys Area Plan in the unincorporated county, which the Washoe County Department of Community Development defines as the Antelope Valley, Cold Springs Valley, Lemmon Valley, and Long Valley hydrographic basins. Population statistics for Washoe County, Reno, and areas within the North Valleys Area Plan are shown in **Table 3-16**.

The population of Nevada grew over 66 percent between the 1990 and 2000 census, primarily due to the growth in the Clark County/Las Vegas area. In comparison, the U.S. population grew at 13 percent during the same time frame.



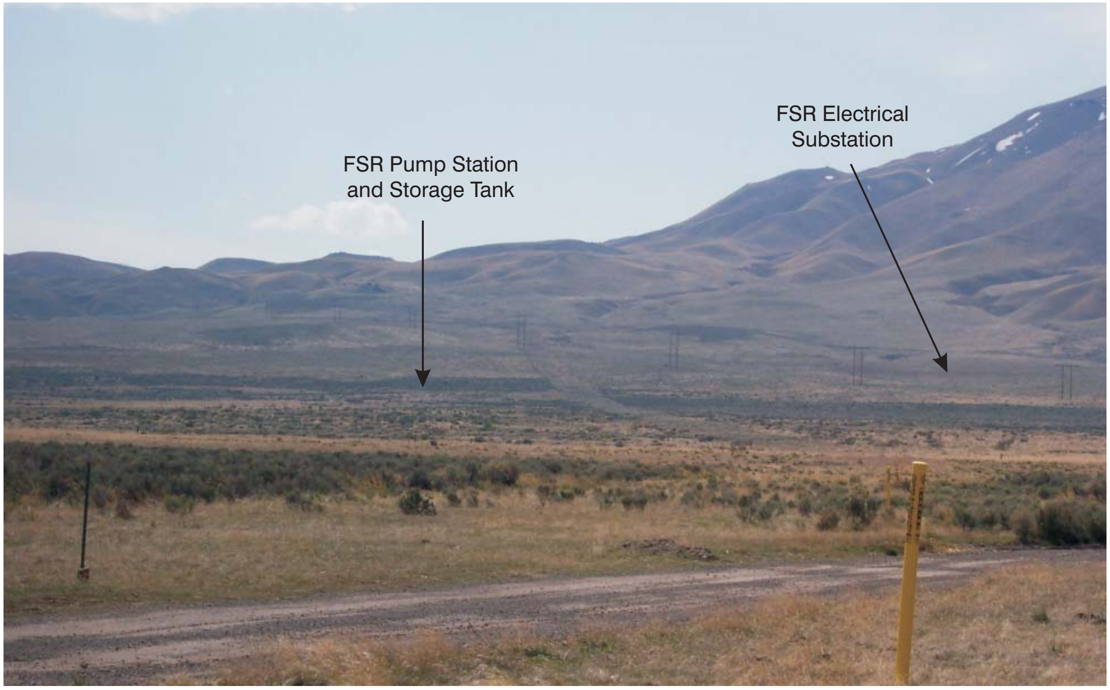
LEGEND

IWS — INTERMOUNTAIN WATER SUPPLY
FSR — FISH SPRINGS RANCH
PROPOSED ACCESS ROUTES
TUSCARORA NATURAL GAS PIPELINE
ALTURAS POWERLINE
TOWNSHIP AND RANGE
PROPOSED IWS WATERLINE
PROPOSED FSR WATERLINE
PROPOSED UNDERGROUND ELECTRIC
PROPOSED ABOVEGROUND ELECTRIC
PROPOSED IWS WELL
PROPOSED FSR WELL
KOP #3 — KEY OBSERVATION POINTS (KOP) LOCATION (Direction Indicated)

N

Not to Scale

Location of Key Observation Points
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 3-8



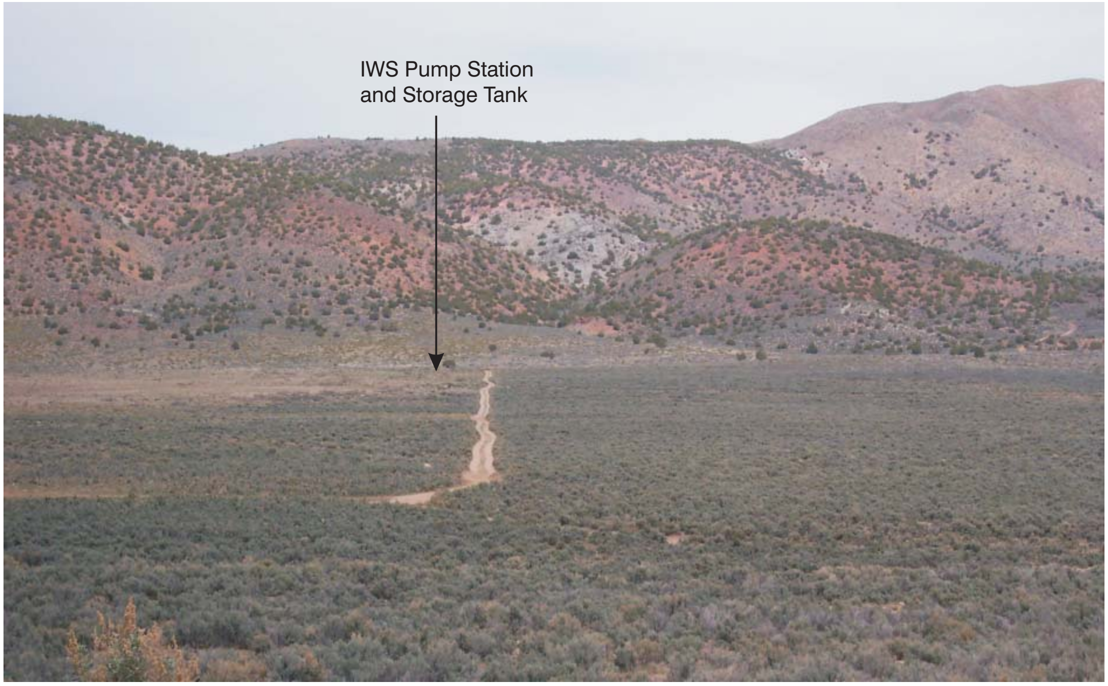
KOP-1 View from Fish Springs Ranch Road looking south.

KOP-2 View from highest point on Matterhorn Boulevard looking east.

See Figure 3-8 for Location of Key Observation Points (KOPs)

FSR = Fish Springs Ranch

KOPs 1 and 2
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 3-9



KOP-3 View from Bedell Flat Road looking east across valley.

See Figure 3-8 for Location of Key Observation Points (KOPs)

IWS = Intermountain Water Supply

KOP 3
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 3-10

TABLE 3-16 Population Statistics for Washoe County, City of Reno, and North Valleys					
Area	1990	2000	Annual Average Growth Rate 1990-2000	2003/2004 Estimates	Annual Average Growth Rate 2000-2003/2004
Washoe County	254,667[1]	339,486[1]	3.3%	383,453[4]	3.2%
City of Reno	133,850[1]	180,480[1]	3.5%	199,249[4]	2.6%
North Valleys Area Plan	13,300[2]	24,431[3]	8.4%	30,147[5]	7.8%

[1] U.S. Bureau of the Census 2001.

[2] Washoe County Department of Community Development 2003.

[3, 5] Giesinger 2004, 2005.

[4] Whitney 2005.

Reno is the county seat and major population center of Washoe County. In 2000, 53 percent of Washoe County's population lived in the City of Reno with 27 percent residing in unincorporated areas of the County. Basic population and demographic information for Washoe County is shown in **Table 3-17**.

According to the Consensus Forecast presented in the Truckee Meadows Regional Plan, age distribution of the population is expected to change over the next 2 decades, thereby creating a net decrease in the percent of the population under 20 and a continued aging of "baby boomers", which will decrease the size the working group and increase the number of retired senior citizens (TMRP 2003).

Housing did not grow as quickly as the population achieving a growth rate of 28.2 percent between 1990 and 2000, reducing the vacancy rate from 19.4 percent in 1990 to just over 8 percent in 2000. An average of 2.6 persons per household was recorded. The Washoe County Department of Community Development estimated there were 8,005 houses in the North Valleys Planning Area in 2000 (Giesinger 2004), indicating a population per household of 3.02 persons. Population by household type in Washoe County during 2000 is presented in **Table 3-18**.

PUBLIC SERVICES AND FACILITIES

The North Valleys Area Plan (Plan), prepared by the Washoe County Department of Community Development in March 2004, provides the following summary of public services and facilities encompassed in the Plan area:

WATER SERVICE

Water service in the Plan area is provided by a combination of local groundwater and surface water supplies from the Truckee River. The two major water providers in the Plan area are Washoe County Department of Water Resources and Truckee Meadows Water Authority (TMWA). Other purveyors of water include: Reno Park Water Company (Utilities, Inc.), Silver Valley Trailer Park, Black Springs General Improvement District (GID), Foothill Trailer Park, Reno Sahara Mobile Homes, and Webb's RV Park. Development in the Planning Area is dependent upon a reliable water supply that will serve the needs of the residents and businesses in the area (Washoe County Department of Community Development 2004).

TABLE 3-17
Washoe County Population by Category

	1990	Percent of Total	2000	Percent of Total	Percent Change 1990-2000	Percent Change per year 1990-2000
Population	254,667		339,486		33%	3.3%
Male	129,088	51%	172,080	51%	33%	3.3%
Female	125,579	49%	167,406	49%	33%	3.3%
Under 20 years	65,983	26%	94,009	28%	42%	4.2%
65 years and over	26,140	10%	35,797	11%	37%	3.7%
Median age			35.6			

Source: Sonoran Institute 2003.

TABLE 3-18
Population by Household Type in 2000 for Washoe County

	County	Percent of Total	State	Percent of Total
Total housing units	143,908		827,457	
Occupied housing units	132,084	91.8	751,165	90.8
Vacant housing units	11,824	8.2	76,292	9.2
Seasonal, Recreation, or Occasional Use	3,624	2.5	16,526	2.0
Homeowner Vacancy Rate (%)	2.0		2.6	
Rental Vacancy Rate (%)	7.8		9.7	
Housing Tenure	**County**	**Percent Occupancy**	**State**	**Percent Occupancy**
Occupied housing units	132,084		751,165	
Owner-occupied housing units	78,296	59.3	457,247	60.9
Renter-occupied housing units	53,788	40.7	293,918	39.1
Avg. household size – owner occupied	2.7		2.7	
Avg. household size – renter occupied	2.4		2.5	

Source: Sonoran Institute 2003.

SANITARY SEWER SERVICE

Sanitary sewer in the Plan area consists of individual septic systems and community sewer services provided by Washoe County and the City of Reno. Residential development in the area must meet County standards requiring a sanitary sewage system capable of handling a minimum of 325 gallons per day per dwelling unit (Washoe County Department of Community Development 2004).

FIRE PROTECTION

The Reno Fire Department provides fire protection services for the Plan area. BLM is responsible for wildland fire protection on public land under its jurisdiction. Emergency and non-emergency ambulance service for the area is provided by the Regional Emergency Medical Services Authority, which also provides air transport within a 150-mile radius of Reno (BLM 2003).

POLICE PROTECTION

Police protection in the Plan area is provided by the Washoe County Sheriff's Office. Currently there are two patrol units regularly assigned to the area, with an average response time of 10 minutes (Washoe County Department of Community Development 2004). Reno Sparks Indian Colony peace officers patrol the Indian Colony.

SCHOOLS

The Plan area is currently served by Nancy Gomes, Lemmon Valley, Silver Lake, Desert Springs, and Alice Smith Elementary schools; William O'Brien Middle School; and North Valleys High School (Washoe County Department of Community Development 2004).

PARKS AND RECREATION FACILITIES

The Plan area is served by five community/neighborhood parks, which total 45 developed acres: Cold Springs, Golden Valley, Lemmon Valley, Martin Luther King, and Silver Knolls Park. Washoe County completed 7 acres of the 160-acre North Valleys Regional Sports Complex in 1996. Opportunities exist in the area for dispersed recreation on public land administered by BLM and the U.S. Forest Service (Washoe County Department of Community Development 2004).

ECONOMIC ACTIVITY

Washoe County is the Study Area for economic activities. The county supported 240,785 full- and part-time jobs in 2000, an increase of 172,382 jobs since 1970, and an annual average increase of 8.4 percent

(**Table 3-19**). The Sonoran Institute (2003) notes that over the last 30 years, job growth in Washoe County has been slower than the state but faster than the nation.

The job mix in Washoe County remained relatively unchanged since 1970. Growth in the services and professional sector was responsible for growth in the number of jobs in the region lead by increases in services (health, legal, business, others); retail trade; finance, insurance, and real estate. Jobs in the manufacturing sector experienced moderate growth as did jobs in construction and agricultural services.

TABLE 3-19
Employment by Industry Changes from 1970 to 2000 for Washoe County

	1970	Percent of Total	2000	Percent of Total	New Employment	Percent of New Employment
Total Employment	68,403	-	240,785	-	172,382	-
Farm and Agricultural Services[1]	492	0.7	2,855	1.2	2,363	1.4
Farm	302	0.4	689	0.3	387	0.2
Ag. Services	190	0.%	2,166	0.9	1,976	1.1
Mining	343	0.5	953	0.4	610	0.4
Manufacturing[2]	3,060	4.5	14,870	6.2	11,810	6.9
Services and Professional	50,097	73.2	181,883	75.5	131,786	76.4
Transportation and Public Utilities	4,697	6.9	13,664	5.7	8,967	5.2
Wholesale Trade	3,315	4.8	13,620	5.7	10,305	6.0
Retail Trade	10,977	16.0	36,928	15.3	25,951	15.1
Finance, Insurance, & Real Estate	5,871	8.6	24,212	10.1	18,341	10.6
Services (Health, Legal, Business, Others	25,237	36.9	93,459	38.8	68,222	39.6
Construction	4,210	6.2	17,607	7.3	13,397	7.8
Government	10,201	14.9	22,617	9.4	12,416	7.2

Source: Sonoran Institute 2003.

[1] Agricultural services include soil preparation services, crop services, forestry services (e.g., reforestation services), fishing, hunting, and trapping.

[2] Manufacturing includes paper, lumber and wood products manufacturing.

In 2000, over 90 percent of Washoe County jobs were in the private sector while 9.4 percent were in government, a decline of 5 percent in the last 30 years. Retail trade, services, and finance/insurance/real estate were the three leading private employers accounting for 64 percent of total jobs in the county and reflecting the importance of the gaming/resort industry on the local economy.

Unemployment rates in Washoe County are typically lower than in Nevada and the rest of the U.S. In 2001, the unemployment rate in Washoe County was 4.1 percent, compared to 5.3 percent for the state and 4.8 percent for the nation (U.S. Department of Labor 2004).

Median household income and per capita income are commonly used to understand the relationship within and outside an area with regard to personal income. Washoe County out performed the state of Nevada and the United States with regards to growth in median household income and per capita income between 1989 and 1999 (**Table 3-20**). In 1999, per capita income level in Washoe County was approximately 6 percent higher than the per capita income level in Nevada and the U.S., and median household income was nearly 3 percent higher than in the state (U.S. Bureau of the Census 2001).

TABLE 3-20
Per Capita and Median Household Income for 1999

	Per Capita Income	Median Household Income
Washoe County	$23,277	$45,815
State of Nevada	$21,989	$44,581
United States	$21,587	$41,994

Source: U.S. Bureau of the Census 2001.

GOVERNMENT AND PUBLIC FINANCE:

Washoe County, established in 1861, is a political subdivision of the state of Nevada with a manager-commission form of government. Washoe County's 2002-2003 budget was $478,972,055, of which $257,348,551 went to the general fund. About 60 percent of the general fund expenditures are for personnel. The 2002-2003 Washoe County budget experienced a $14 million shortfall forcing reductions and a 6 cent property tax increase. Washoe County receives $1.3453 per $100 of assessed value. Nevada ranks 43 out of the 50 states for tax burden per capita for state and local government (Washoe County Fast Facts 2004). Tax revenues increased during FY 2003-2004 budget cycle, indicating an economic upturn in Washoe County.

CULTURAL RESOURCES

Cultural resources are locations of past human activity, occupation, or use. Prehistoric resources reflect activities that occurred prior to introduction of written records. Since written documentation is absent, archaeological sites are the only source of data concerning prehistoric societies. Historic resources reflect Euro-American and Asian-American occupation. The scientific value of these resources relates to their potential to inform on how human societies operate and change. In addition to their scientific value, cultural resources may have aesthetic and cultural value. Aesthetic values may be expressed in rock art sites, or in standing structures of architectural significance. Historic sites may have cultural value if they link a living community to a place that conveys a sense of cultural identity. The Study Area for cultural resources is defined by the corridors associated with the proposed Projects Area and land adjacent to the Projects Area.

PREHISTORIC OVERVIEW

The Early Holocene period in the Great Basin (ca. 12,000 to 7,000 BP) is characterized by Great Basin fluted points, Great Basin Stemmed points as well as crescents, formal scrapers, burins and gravers (Delacorte 1997; Young *et al.* 2000). Sites from the Early Holocene in the Great Basin tend to be low in density, have tool kits generally associated with lake/marsh systems suggesting small populations, high residential mobility, and a focus on lakeshore resources (Young *et al.* 2000).

Onset of the Post-Mazama period (ca. 7,000 to 5,000 BP) is marked by an ash layer created by eruption of Mount Mazama about 7000 years before present, and also by the appearance of Northern Side-notched points. This point type is rare in the general Project Area (Young *et al.* 2000). It appears that some corner-notch, contracting stem and lanceolate projectile points might have first appeared during the Post-Mazama period (Delacorte 1997; Young *et al.* 2000). Post-Mazama sites tend to show a transition away from lakeshore/marsh environments and the more intensive utilization of well-watered refugia. This is due to a mid-Holocene warming episode in the Great Basin (Young *et al.* 2000).

The Early Archaic Period (ca. 5,000 to 3,500 BP) is represented technologically by the appearance of milling stones and Gatecliff points (Young *et al.* 2000). Site density increases over the Post-Mazama period and there is an increased occupation of uplands. Early Archaic sites tend to be small and are characterized by generalized tool kits with signs of short site occupations. This suggests that population densities during the Early Archaic were low and that groups were highly mobile, exploiting a variety of dispersed plant and animal resources.

The Middle Archaic Period (ca. 3,500 to 1,300 BP) is a period of increasing economic and social complexity evidenced by a rise in artifact and site type diversity. In the western Great Basin and on the eastern front of the Sierras this period is associated with early and late Martis and Elko style points (McGuire 1997). During this period the variety and quantity of perishable artifacts increases substantially (Young *et al.* 2000). There is also an increase in the presence of curated ground stone tools. Site size increases and there is a shift to a more residential pattern with the appearance of large base camps and associated task-specific locations that show evidence of repeated use. The increase in long-term occupation sites corresponds to evidence of a greater reliance on communal hunting and gathering of resources that required complex social organization or large amounts of labor to exploit (Young *et al.* 2000).

Economic, technological, and social trends that started during the Middle Archaic intensified during the Late Archaic Period (ca 1,300 to 600 BP). Technologically the Late Archaic is characterized by Rose Spring and Eastgate points, the introduction of the bow and arrow, and the shift toward smaller bifaces and expediently manufactured flake tools. There is also a shift towards the use of locally available tool stone, in some cases from sources of poor quality (Young *et al.* 2000). Ground stone tools were of a more expedient nature and there was a decline in the use of perishable technologies. The tendency toward less formal and non-curated technologies is associated with a diminished foraging range and an increase in local resource exploitation. The use of pine nuts and an increased emphasis on hunting small game led to the occupation of previously unused areas in the uplands and on valley floors (Young *et al.* 2000).

Technologically the beginning of the Terminal Prehistoric Period (ca. 600 BP to contact) is marked by the appearance of the Desert Side-notch and Cottonwood projectile points, generally associated with the arrival of Numic speaking groups to the northwestern Great Basin. Aside from new projectile point types there is little technological change from the Late Archaic. Sites from this period do show a shift toward new areas of resource exploitation. There also appears to be a change in social organization from the band-sized groups of the Middle and Late Archaic to family based units (Young *et al.* 2000).

HISTORICAL OVERVIEW

Several themes prominent to regional history are not likely to be reflected within the immediate study corridor. Those themes include fur trapping, early exploration, emigration associated with the California and Nevada gold rushes, railroads, and water reclamation activities typical of the early 1900s. Even mining, which played such a large role elsewhere in the region, is not likely to be well represented in the Projects Area. Rather, historic period cultural resources found in the project area relate mostly to the ranching, dry land farming, and transportation themes.

MINING

Little mining related activity appears to have occurred along the proposed Projects corridor. The nearest mining areas are the Peavine, Stateline Peak, and Pyramid districts. The Peavine District, located immediately northwest of Reno, was established after extensive gold, silver, and copper deposits were discovered on the east side of Peavine Peak in 1863. Within a year, the town had over 200 inhabitants. Activities peaked during the early 1870s due in part to the mine's proximity to the CPPR railroad. By 1880 the population had declined to a few dozen people. Production data from the Peavine District suggest it was the most active during the early 1870s, the 1900s, and from 1936 through 1944 (Bonham 1969). The Pyramid District is located in the Mullen Pass area, just southwest of Pyramid Lake. Claims were located in the area as early as 1863, but work did not begin in earnest until the mid 1870s. Available records (Bonham 1969) suggest that the main period of production in the district was during the 1870s and 1880s. Since that time, small-scale mining activities have resulted in the occasional shipment of selected ore. Uranium was discovered in the district in 1954 and intermittent small-scale production has continued up to the present.

The Stateline Peak District encompasses Petersen Mountain, located along the boundary between Nevada and California. Two claims in the district were patented in 1887 and some copper ore was removed. The Antelope Mine was opened in the late 1930s and saw some limited production through 1941. The mine was apparently reopened in 1945, but production data are unavailable. Uranium was discovered on the Buckhorn claims in 1954 and small-scale production was reported in 1955 and 1956 (Bonham 1969).

RANCHING

A combination of factors led to development of ranching in the Study Area. Prior to the advent of the railroad, California had been the regional center of cattle production. Western Nevada relied on California as a source of beef cattle during these early years. Due to droughts during the late 1860s California ranchers began using rangelands in northern Nevada as summer range. The advent of the railroad in 1868 allowed the beef industry to become regional in scope (Townley 1983). Cattle could be taken off of the range in northern Washoe County, fattened in the Truckee Meadows, and shipped to the bay area for slaughter. Even comparatively remote areas such as the proposed Project corridor were integrated into this regional marketplace.

Locally, ranching began in the Honey Lake and Winnemucca Lake areas during the 1850s through the 1870s. During this period, many ranchers drove their herds to the central valley of California during the winter, using their Nevada ranch lands only as summer pasture. Ranchers acquired land through the National Homestead Act of 1862, the Swamp and Overflow Act, or by filing preemption claims. By these means, early ranchers gained access to most if not all water sources and potential pasture areas in the region. By controlling the water, the rancher controlled the range. This allowed ranchers to enlarge their herds of cattle, sheep, and horses and to grow and cut more hay. Year-round operations became more commonplace.

The period between 1880 and 1900 was one of economic depression over much of Nevada. Mining on the Comstock had collapsed and there was little to replace it. The state's population declined by approximately 35 percent and those that did remain became more urbanized. Transportation became a primary economic theme of the period, drawing people to towns and cities along railroads corridors. Many pinned their economic hopes for the state on agriculture (Townley 1983). Large ranching operations came into being that operated over huge acreages within Nevada and adjoining states. This was the time of the cattle baron.

The Pyramid Land and Stock Company, owned by Patrick Flanigan, was the local manifestation of this pattern. Flanigan moved to Nevada in 1877 and began herding sheep in the early 1880s, grazing on public domain land around Pyramid Lake. He began acquiring property in the 1890s, including ranches near

Gerlach, Constantia (in California), in Winnemucca Valley, and a number in the general Projects Area. At the height of his career, Flanigan ran more than 30,000 ewes, 2,000 cattle, and 1,800 horses in Washoe County (Moody 1985; Wentworth 1948). Beginning in 1914, Flanigan's empire began to unravel. Declining sheep prices and failed irrigation ventures eventually forced him into bankruptcy.

The sheep market boomed during the 1910s and 1920s, prompting many ranchers to increase the number of sheep they kept versus cattle. After the Wool Crash of 1923, the sheep industry dwindled. This trend was reinforced by several drought years, the cumulative effect on vegetation of over grazing, and passage of the Taylor Grazing Act. This act was intended to manage public grazing, and to prevent degradation of the public domain due to overgrazing. By World War II, ranching was no longer a prominent industry in the general Projects Area.

DRY LAND FARMING

Beginning in the late 1800s, there was an interest in reclaiming lands with 20 inches or less of annual rainfall. This, coupled with the still prevalent Jeffersonian ideology of land ownership and independence, led to a new wave of agriculturalists – dry land farmers. The dry land farming movement reached full flower during the first two decades of the Twentieth Century. Not surprisingly, the dry land farming movement coincided with a renewed interest in claiming federal land. Ranching interests had claimed prime agricultural land containing running water during the 1870s and 1880s. By the early part of the twentieth century, only marginal land remained available for homesteading. In the absence of a secure source of water, many homesteaders found that they could not make a living on parcels as small as 160 acres. The Enlarged Homestead Act of 1909 increased the amount of land that could be filed on to 320 acres. Subsequent revisions to the act further enlarged the size of the parcel that could be claimed, and relaxed residence and improvement requirements.

Many dry land farmers homesteaded in Honey Lake Valley during the 1900s and 1910s, when the dry farming movement was at its height. These homesteads operated at two levels: a subsistence level and at a capital generating level. Gardens provided fresh produce that could be canned for later use. Keeping a limited number of chickens, hogs, and maybe even cattle provided eggs and milk, as well as meat. These activities were intended to ensure that the family would not starve. In theory, the homestead was also supposed to produce a crop of sufficient size that it could be sold. Money derived from the crop was used to purchase items that could not be grown on the homestead. When the crop failed, the homesteader was forced to barter for those goods, borrow money to pay for them, or simply do without. Their limited profit margin put homesteaders in an awkward position when it came to shifts in the economic market place. Their limited reserves made them particularly susceptible to local or national agricultural depressions. This was a major factor following World War I when an agricultural depression set in that lasted throughout the 1920s. Dry land homesteaders were also subject to changes in local climatic conditions. Droughts, changing water tables, depletion of nutrients in the soil, or the accumulation of salts could have devastating impacts on a small-scale operation. For example, local droughts occurred in the Honey Lake area during the mid 1910s. By 1919, the lake was dry. It did not fill again for over 20 years.

Most dry land homesteads did not prove to be economically viable. Some provided for a subsistence level of existence for the residing family, but most failed even at that basic level. Many homesteaders took jobs to secure sufficient capital to keep their families on the homestead long enough to prove up. Many moved off their claims before proving up. Homesteaders had largely left the area by the 1920s. Few holdouts survived the depression.

ROADWAYS

The widely dispersed nature of settlement in the American West carried with it the need for dependable transportation systems. As local communities began to grow, and as the agricultural and commercial basis of the region developed, efforts were made to establish roads for internal circulation and with improved access to external markets. During the mid-19th century, private parties were responsible form most road building. Not until the later part of the 19th century did counties develop the administrative apparatus and expertise to build a comprehensive road network. Four north-to-south roads extended through or adjacent to the Projects Area.

The Truckee Meadows to Honey Lake Road extended along what is today U.S. 395. Already established by 1865, the "Road to Peavine and Honey Lake" extended north from Reno, through Golden and Lemmon Valleys, and then northward. This road corridor, located west of the Projects Area, has been largely covered over by later transportation systems, be they highways or railroads. Only brief segments remain in isolated locations.

East of the Projects Area, a local roadway was established that connected the Truckee Meadows and Surprise Valley in northeastern California. The Surprise Valley Road ran from the Truckee River north through Spanish Springs Valley, then through Warm Springs and Winnemucca valleys, over to Honey Lake, then north to Surprise Valley. In its early years, the road served as a cut-off to the newly discovered gold mines of southern Idaho. Once the Idaho gold rush had subsided, the road to Surprise Valley was far less traveled. The portion of this road that extends from Winnemucca Valley to Fish Springs extends along the proposed Projects rights-of-way.

Between these two primary travel corridors, two lesser roads were noted. The first was known as the Anderson Road. Anderson registered his toll road in March of 1872 (Angus No Date) along what appears to be an earlier wagon road. The Anderson Road extended north-northeast from Reno through Sun Valley and Spanish Springs Valley. It intersected the Surprise Valley Road at Junction House. By 1880, Anderson had sold the road to Washoe County, and it remained in use until at least 1908. The road was alternately known as the Winnemucca Valley Road or the Pyramid Lake Indian Reservation Road. Portions of this road separate from the Surprise Valley Road are located outside the proposed Projects rights-of-way.

The fourth road extended north from Reno through Lemmon Valley (Stead area) and into Red Rock Valley. In Red Rock Valley, the road branched, one turning west and joining with the Truckee Meadows to Honey Lake Road. The other branch turned to the east and extended to a point called "Todhunter" at the very northwest edge of Bedell Flat (shown as a "ranch" on 1:250,000 scale topographic map). At this ranch, the road again branched. The fork to the southeast extended along the northeast edge of Bedell Flat before passing into Warm Springs Valley. The branch to the north intersected an east-west road that extends along Dry Valley Creek. The road along Dry Valley Creek served as an east to west link between the Surprise Valley Road and the Truckee Meadows to Honey Lake Road. Portions of the unnamed road extend through the proposed Projects rights-of-way.

CULTURAL RESOURCE PROJECTS IN AREA OF POTENTIAL EFFECT

In total, 40 cultural resource projects have occurred completely or in part within the archival Study Area. These studies include archaeological surveys, testing, and data recovery associated with utilities development, agricultural/irrigation improvements, fire rehabilitation, and recreational use of public land.

A total of 117 cultural resources have been identified within the North Valleys Rights-of-Way Projects corridor. Of these, 43 are isolated artifacts and 74 are sites. Of the isolated finds, 31 contained items that are prehistoric in age, while the remaining 12 contained historic period items. These isolates meet criteria listed in the *State Protocol Agreement between the Bureau of Land Management and the Nevada State Historic Preservation Office* for isolated artifacts and features. As noted in the State Protocol, isolated artifacts and features are categorically ineligible for listing on the National Register.

Of the 74 sites, 59 contain prehistoric period material, nine contain historic period material, and six contain material representing both the prehistoric and historic period, for a total of 80 site components. Ten of the site components are National Register eligible, 55 site components have been determined not to be National Register eligible, and 15 site components remain unevaluated.

NATIVE AMERICAN RELIGIOUS CONCERNS/INDIAN TRUST RESPONSIBILITIES

Ethnographic resources include sites or areas of concern to Native American groups either for heritage or religious reasons. A site may have a heritage value if it serves as a link between a living community and a place that conveys a sense of cultural identity, or if a particular social or religious concern has been expressed regarding the site.

The proposed Projects lie within the ethnographic territory of three tribal groups – Northern Paiute, Mountain Maidu, and Washoe. This area constitutes the Study Area for Native American Concerns.

Two Northern Paiute bands inhabited the area, the *Tasiget Tuviwarai* and the *Kuyuidokado* Paiute bands. The *Tasiget Tuviwarai* mainly inhabited Winnemucca and Spanish Springs valleys and the Lower

Truckee Meadows. The *Kuyuidokado* Paiute band occupied an area east of the *Tasiget Tuviwarai*, which included all of Pyramid Lake and lower reaches of the Truckee River. The Washoe occupied the Sierra Nevada region that included Lake Tahoe and the valleys along the eastern slope of the Sierra Nevada Mountains.

NORTHERN PAIUTE

Ethnographic sources regarding the Northern Paiute include Kelly (1932), Stewart (1939, 1941), Riddell (1960), Heizer (1970), Inter-tribal Council (1976), Pendleton *et al.* (1982), and Fowler and Liljeblad (1986). Young and McGuire (2003), Young *et al.* (2000), and Delacorte (1997) provide recent summaries pertinent to the immediate Projects Area.

At the time of European contact, the Great Basin was occupied by six Numic speaking groups, one of which was the Northern Paiute. The Northern Paiute differed slightly from band to band due to variations in local environments, but generally were organized in the same fashion and followed a similar annual round (Delacorte 1997).

The Northern Paiute were hunter-gatherers. Their subsistence was based on seasonal rounds that focused on geographical and seasonal variations in food sources. Plant resources provided the bulk of the diet from late spring to early fall. During this time seeds and roots were gathered and stored for the winter. During the spring fishing became a major importance when cutthroat trout (*Salmo clarki henshawii)*, suckers (*Catostomus* sp.) and cui-ui (*Chasmistes cujus*) migrated up local rivers to spawn. However, an emphasis remained on gathering various greens, shoots, and early ripening seeds found in and around springs and drainages. In late fall, trips were made to the Diamond Mountains and Virginia Range to collect pine nuts.

Although not as prominent an activity as gathering, hunting was still practiced. Deer, antelope, and desert bighorn sheep were the primary game of choice, and were hunted by individuals and groups. Groups would drive large numbers of antelope into corrals. This communal technique also was used in the hunting of rabbits and hares in the fall when the animals were in peak condition. Marshes were exploited for various resources including ducks and waterfowl, which were taken using decoys, nets, and traps.

Northern Paiute social and political organization was centered on the independent family. Senior family members made decisions regarding household affairs and dealings with other family groups. Outside these family units, local camps had headmen (*poinabi*) that acted as camp advisors and served as the focal point for discussions of mutual concerns. The headmen were selected by consensus of the group; this person was not an inherited position. Task group leaders were responsible for antelope, rabbit, and deer drives, as well as major fishing expeditions. These task-oriented positions fluctuated and were determined by an individual's skill and luck. While in charge, task leaders ran the daily activities connected with that particular task (Fowler and Liljeblad 1986).

Social organization of the Northern Paiute was centered on a network of kinsmen and friends that included family, close relatives, the camp to which the family belonged, associated camp groups, and individuals that resided outside the camp. The family remained the most important unit for social integration. Family units included parents and siblings and as time went on, spouses and children were included. The camp group was an important social organization to which a family belonged. The camp group often changed size and composition due to seasonality and resource availability. Camps would often pool resources and work as cooperative units for tasks such as game drives (Fowler and Liljeblad 1986).

MOUNTAIN MAIDU

Ethnographic sources for the Mountain Maidu include Powers (1976), Dixon (1905), Kroeber (1925), Voeglin (1942), and Riddell (1960, 1968, 1978).

The Mountain Maidu occupied an area that extended from Eagle Lake on the north to Sierra Buttes on the south, and from Lassen Peak on the west to Honey Lake on the east. The Maidu inhabited a series of mountain valleys and where weather allowed, permanent villages were established. Elsewhere, seasonal villages or camps were only occupied during warmer months of the year. The Maidu penetration into the Great Basin was greater in earlier times than at the time of first European contact. By their own admission, the Maidu at some earlier time held all of Honey Lake Valley and its environs. About 1700, the Maidu withdrew to the west side of Honey Lake, vacating areas east of the lake that were subsequently taken over by the Northern Paiute.

A village community served as the only political organization apparent within the Maidu. Recognized as an autonomous political unit, a vial community consisted of several adjacent villages. Each village was self-sufficient. Individual villages consisted of fewer than ten houses and were occupied by about 35 people. Each community village owned and defended a territory held in common by all members of the village community. A village community seldom included more than 200 individuals. The village with the largest semi-subterranean earth lodge was considered the central village. This was the residence of the headman or chief of the village community. Dixon (1905) reports that the chief was selected with the aid of a shaman, whereas Vogelin (1942) indicates the position was inherited patrilineally. The chief was a man of wealth, ability, and generosity and his role was generally that of an advisor. A council assisted the chief, providing essential ritual and political leadership to the village.

The Maidu regularly constructed three types of structures. The first was a semi-subterranean, earth-covered structure occupied during the winter by one or more families. The floor of the lodge was excavated three to five feet below ground and ranged in size from 20 to 40 feet in diameter. The excavation was covered with poles, matting, and earth removed during excavation. Major villages had a larger version of this type lodge that was used as a ceremonial or assembly house. The third type of structure, a simple shade shelter constructed of upright poles supporting a flat roof of branches, was used during the summer months. These shelters were constructed close to hunting and gathering sites located some distance away from winter camps.

The Maidu made extensive use of plants and animals, serving subsistence, religious, and material necessities. In the Susanville area, Maidu subsistence activities focused on fish and waterfowl resources present in local streams and marshes, as well as plentiful game such as deer. Men also hunted bear, both for meat and for the hide, which was used in rituals. Women and children gathered nuts and seeds. Acorns were the primary source of nut meat. Once leached the acorn flour was used to make soup, mush, or bread. Other nuts that were collected included sugar pine, yellow pine, hazelnuts, and buckeye trees. Women also gathered and processed vegetal foods such as greens, tubers, seeds, berries, nuts, and acorns. Women made all of their own tools, which included an array of baskets used for the collection, processing, and storage of food. Mint tea and manzanita cider were common drinks.

During the spring, summer, and fall months, village members moved about their prescribed territories engaging in subsistence activities. With the onset of winter, however, activities diminished and became focused around the winter village. Although the Maidu territory was laced with a network of trails, it was unusual for a person living in a village to travel more than 20 miles from home in their lifetime. Trade items were widely distributed from village to village and from group to group. During winter months, villages made do using preserved and stored foods. Some families relocated to lower elevations, especially during severe winters. In most cases, however, groups of Maidu remained in their permanent village sites throughout the winter months.

WASHOE

Ethnographic data on the Washoe are contained in d'Azevedo (1956, 1963, and 1986), Barrett (1917), Downs (1966), Fowler *et al.* (1981), S. and R. Freed (1963), Lowie (1939), Nevers (1976), Price (1962, 1980), and Siskin (1941).

At the time of European contact, the Washoe was the only group living in the Great Basin whose language was not Numic. This has led many to believe that the Washoe have lived in the Great Basin longer than their Numic speaking neighbors. The Washoe are geographically located in an area that is partially in the Great Basin and partially in California. As a result, the Washoe show characteristics of both regions. The area occupied by the Washoe contained a variety of life zones, from the boreal habitats of the Sierra slopes and Lake Tahoe to the Upper Sonoran xeric valley bottoms north and south of the Sierra slopes. This territory contained many plant and animal species not found in more arid portions of the Great Basin. Therefore, with periodic forays into adjoining areas for pine nuts, acorns, and fish, the Washoe were able to ensure a stable food supply.

Major habitation places were on valley floors where year-round settlements were established. The settlements were usually located on high ground close to a reliable source of water and fuel. Houses were constructed of poles covered by bark and set around a shallow pit to form a conical framework (Price 1962). These permanent encampments were seldom abandoned. While some members would leave for short journeys into the Sacramento Valley and Honey, Pyramid, Walker, and Mono lakes to exploit seasonal resources, the elderly and children would often remain behind at the camp (d'Azevedo 1986). Due to the abundance of lakes and streams, the Washoe relied heavily upon fish for year round sustenance. Lahontan suckers, mountain whitefish, trout, and cui-ui were exploited from various regions across the Washoe territory. Using different methods including spears, nets, weirs, traps, and hook and line, fish were harvested from lakes and rivers. The fish were then cooked on coals or pit roasted, any excess would be dried and stored for future use (d'Azevedo 1986).

Another vital part of subsistence was the reliance on plant foods. In early spring, bulbs and roots such as camas, bitterroot, sego lily, and wild onion were collected from valley floors. After this harvest, attention was focused on seed-bearing grasses and weedy annuals in the mid-summer (d'Azevedo 1986). Autumn brought acorns and pine nuts to the higher elevations that were harvested by family groups.

The Washoe did use hunting as a supplementary source of food. Individual hunters often pursued deer, antelope, and mountain sheep. And, in the case of antelope, communal drives were organized. These animals could be hunted year-round, although late summer was the ideal time to hunt deer (d'Azevedo 1986). Small game such as rabbits and hares were hunted as well as upland birds and waterfowl. The principal tool in hunting was the bow and arrow, and, in the case of communal antelope hunts, v-shaped corrals were made to trap animals.

The basic unit of social organization was a cluster of closely related households that shared the same or nearby winter camps and identified with its own leader. The nuclear family was seen as part of an extended family of close relatives living in a single dwelling or cluster of houses comprising the local community. Community size fluctuated over the course of a year, as various activities required families to come and go with the seasons.

Leadership roles among the Washoe were usually assigned to a respected and older person whom others came to for advice. Headmen (and occasional headwomen) were chosen by the group, and the position was not inheritable or permanent. The headman was responsible for maintaining communication amongst groups. Sometimes this leader was the informal representative of a regional community (d'Azevedo 1986). Other leadership roles included war leaders who were selected from the best warriors. This position lasted only as long as the specific danger lasted. Another leadership role was the man selected to lead rabbit and antelope drives, which were also determined by skill and perceived natural powers as opposed to inheritance.

INDIAN TRUST RESPONSIBILITIES

It is the policy of the BLM Carson City Field Office to recognize and fulfill its obligations to identify, protect, and conserve trust resources of federally recognized Indian tribes and tribal members, and to consult with tribes on a government-to-government basis whenever plans or actions may potentially affect tribal trust resources, trust assets, or tribal health and safety. Any effect must be explicitly addressed in the planning/decision documents, including, but not limited to, Environmental Assessments, Environmental Impact Statements, and/or Management Plans prepared for a project or activity. The documentation shall:

(1) Clearly state the rationale for the recommended decision; and

(2) Explain how the decision will be consistent with BLM's trust responsibility.

In the event an evaluation reveals impacts to Indian trust resources, trust assets, or tribal health and safety, BLM would consult with the affected recognized tribal government(s), the appropriate office(s) of the Bureau of Indian Affairs, the Office of the Solicitor, and the Office of American Indian Trust. BLM shall be open and candid with tribal government(s) during consultations so that the affected tribe(s) may fully evaluate the potential impact of the proposal on trust resources and the affected bureau(s) or office(s), as trustee, may fully incorporate tribal views in its decision-making processes. These consultations, whether initiated by the tribe or BLM, shall be respectful of tribal sovereignty. Information received shall be deemed confidential, unless otherwise provided by applicable law, regulations, or Administration policy, if disclosure would negatively impact upon a trust resource or compromise the trustee's legal position in anticipation of or during administrative proceedings or litigation on behalf of tribal government(s).

CONSULTATION ACTIVITIES

Native American consultation regarding the proposed Projects is ongoing. Consultation will be conducted in accordance with the above stated policy and provisions of the National Historic Preservation Act, the American Indian Religious Freedom Act, and the Native American Graves Protection and Repatriation Act. The BLM Carson City Field Office has contacted representatives of the Pyramid Lake Paiute Tribe, Reno-Sparks Indian Colony, Susanville Ranchera, and Washoe Tribe. Information regarding effects the proposed Projects would have on locations of religious, traditional, or cultural importance was requested by BLM. The BLM will make a reasonable effort to contact individuals with close ties to the Projects Area, especially those that might be familiar with traditional cultural practices that may have occurred there.

WINTER'S DOCTRINE

The Winter's Doctrine is a legal doctrine arising from the case of *Winters v. U.S. Supreme Court* (1908, 207 U. S. 564) that holds upon creation of a federal reservation on public domain, the reservation has appurtenant to it the right to divert as much water from streams within or bordering it as necessary to serve the purposes for which the reservation was created (Water Resources Research Center 2003). The Winter's Doctrine is also known as the *implied reservation* or *reserved water rights doctrine*.

The Pyramid Lake Paiute Tribe's water rights include a reserved right for agricultural purposes to approximately 5,875 acres of land on the Reservation in the Orr Ditch Decree (see *Nevada v. United States* 463 U.S. 110, 117-18) (1983) (*Nevada*), but was held in *Nevada* to be bound (through the United States) by the Orr Ditch Decree and not to have any right to seek additional water from the Truckee River for purposes of enhancing the fishery in Pyramid Lake. Title II, Public Law 101-618 identifies federal legislation declaring certain rights to enhance flows in to Pyramid Lake and establishes agreements to implement the right.

ENVIRONMENTAL JUSTICE

Executive Order 12898 directs federal agencies to identify and address any disproportionately high and adverse human health or environmental effects of their programs on minority and low-income populations. Minority populations included in the census are identified as Blacks or African Americans; American Indians or Alaska Natives; Asians: Native Hawaiian or other Pacific Islanders; Hispanic; Latino; or other. Low-income level is defined as persons living below the poverty level. In 2000, the poverty-weighted average threshold for a family of four was $17,603, and $8,794 for an unrelated individual. Environmental Protection Agency (EPA), Council on Environmental Quality (CEQ), and BLM IM 2002-164 guidelines for the conduct of environmental justice assessments were followed when preparing this analysis. The Region of Influence or Study Area for environmental justice is Washoe County, including the Reno-Sparks Indian Colony and the Pyramid Lake Paiute Tribe.

IDENTIFICATION OF MINORITY AND LOW INCOME POPULATIONS

Within the Study Area, the Reno-Sparks Indian Colony and the Pyramid Lake Indian Reservation were identified as potential areas for minority or low-income population. The Reno-Sparks Indian Colony is composed of approximately 94 percent American Indians and the Pyramid Lake Indian Reservation is composed of 69 percent American Indians. These data indicate that a minority population does exist in the Study Area (BLM 2003). Population by race for Washoe County in 2000 is shown in **Table 3-21**.

Within Washoe County, approximately 10 percent of the population was below poverty level in 1999, the year for which the most current census data are available. Within the Reno-Sparks Indian Colony, approximately 20 percent lived below the poverty level. Eighteen percent of population within the

Pyramid Lake Indian Reservation was below poverty level as of 1999. These high poverty rates indicate that low-income populations do exist near the Projects Area.

TABLE 3-21
Population by Race in 2000 for Washoe County

	County Population	Percent of Total	State Population	Percent of Total
White	272,985	80.4	1,501,886	75.2
Black or African American	7,093	2.1	135,477	6.8
American Indian or Alaska Native	6,162	1.8	26,420	1.3
Asian	14,526	4.3	90,266	4.5
Native Hawaiian &Other Pacific islander	1,553	0.5	8,426	0.4
Some other race	26,034	7.7	159,354	8.0
2 or more races	11,133	3.3	76,428	3.8
Total Population	**339,486**		**1,99,257**	
Hispanic or Latino (of any race)	56,301	16.6	393,970	19.7
Not Hispanic or Latino	283,185	83.4	1,604,287	80.3
Total Population	**339,486**		**1,999,257**	

Source: Sonoran Institute 2003.

PUBLIC INVOLVEMENT AND ENVIRONMENTAL JUSTICE

The environmental justice process encourages a scan prior to public scoping of the Proposed Projects to ensure that minority and low-income populations are included in the range of public involvement activities. Public involvement meets the following requirements of Executive Order 12898:

- Aids in identifying minority and low-income groups.

- Provides the means for these groups to participate in federal decision-making that might affect them.

A full description of the EIS public involvement process can be found in Chapter 1, but persons and organizations known or thought to have a potential interest, including minority, low-income, disadvantaged, and Native American groups, were identified, informed, and given the opportunity to participate in the NEPA process.

CHAPTER 4

CONSEQUENCES OF PROPOSED ACTIONS AND ALTERNATIVES

INTRODUCTION

Potential direct and indirect impacts of construction and operation of proposed water transmission pipelines and associated components (Proposed Actions) on environmental and social and economic resources are discussed in this chapter. This chapter also describes potential direct and indirect impacts of alternatives to the Proposed Actions that are designed to reduce or eliminate potentially adverse impacts resulting from implementation of the Proposed Actions. Detailed descriptions of alternatives to the Proposed Actions are included in Chapter 2.

Implementation of the Proposed Actions would result in irreversible and irretrievable commitments of resources, residual impacts, and cumulative effects.

- Irreversible commitments are those that cannot be reversed, except over a very long period of time;

- Irretrievable commitments are those that are lost for a period of time;

- Residual impacts are those effects remaining after implementation of mitigation measures; and

- Cumulative effects result from incremental effects of the Proposed Actions when combined with past, present, and reasonably foreseeable actions.

As defined in the beginning of Chapter 3, "Projects Area" refers to the proposed pipeline rights-of-way (Proposed Actions) and associated components shown on **Figure 3-1**. The term "Study Area" is synonymous with Projects Area for some resources (soil and non-wetland vegetation), but encompasses a larger geographic area for most resources. Study Areas for each environmental resource are based on predicted locations of direct and indirect impacts from the Proposed Actions and Alternatives. "Service Area" as used in this chapter, is the area of water distribution and use (i.e., Stead/Lemmon Valley Area) after the water leaves the terminus for each water transmission pipeline shown on **Figure 3-4**.

BLM has reviewed all aspects of the Proposed Actions and the following alternatives to Proposed Actions: Alternative A – Construct Pipelines within Common Right-of-Way; and No Action Alternative. Implementation of the Proposed Actions and/or Alternative A would cause resources to be consumed, committed, or lost over the course of Projects' development and implementation. Nonrenewable resources, such as fossil fuels and non-recyclable materials, would be irreversibly committed during operations.

Where potential impacts associated with the Proposed Actions are unique to either the Fish Springs Ranch Project or the Intermountain Water Supply Project, descriptions of those impacts are distinguished in this section of the EIS. Where potential impacts are common to both Proposed Actions, those impacts are so designated in this section.

BLM has no jurisdictional authority over water rights, pumping rates, distribution, use, and volume of water to be transferred to the Stead/Lemmon Valley Area by Fish Springs Ranch and Intermountain Water Supply. The Nevada State Engineer has addressed issues pertaining to groundwater withdrawal from Honey Lake Valley, Dry Valley, and Bedell Flat during its review of applications for the respective water rights. Some of the application review processes included public meetings. Water distribution and use associated with development of the Stead/Lemmon Valley Area that would result from importation of water by Washoe County, Truckee Meadows Water Authority, or private entities has been addressed by local and regional planning agencies in accordance with Nevada statutes. This chapter provides a description of how environmental, social and economic resources would be affected as a result of the Proposed Actions described in Chapter 2.

This chapter outlines potential monitoring and mitigation measures BLM has identified that could be used to reduce or eliminate impacts to resources within the Projects Area resulting from construction of the water transmission pipelines and associated facilities. Recommended monitoring and management of water resources related to potential impacts from groundwater extraction are presented in **Appendix D**.

The agency used environmental data collected in the Projects Area and surrounding areas to predict environmental effects that could result from the Proposed Actions and Alternatives. A level of uncertainty is associated with any set of data in terms of predicting impacts, especially where natural systems are involved. Predictions described in this analysis are intended to allow comparison of alternatives to the Proposed Actions, as well as provide a method to determine whether activities proposed by the applicants would be expected to comply with applicable regulations.

GEOLOGY, MINERALS, AND PALEONTOLOGY

SUMMARY

Construction and operation of water transmission pipelines as described in the Proposed Actions would not result in impacts to geologic resources,, minerals, or paleontological resources of the Projects Area. Although construction activities may result in loss or destruction of fossils, rock formations in this region of Nevada are not known for containing significant (vertebrate) paleontological resources. If rare plant, vertebrate, or invertebrate fossils are discovered during construction, BLM would be contacted to determine steps necessary to preserve the fossils. Seismic hazards could cause a rupture or failure of the pipelines or damage to related facilities but would not present a threat to public safety.

DIRECT AND INDIRECT IMPACTS

Proposed Actions

Impacts Common to Proposed Actions

Construction and operation of water transmission pipelines as described in the Proposed Actions would not result in impacts on geological resources, minerals, or paleontological resources of the Projects Area and Service Area. Construction activities are limited to shallow depths where the primary resource that would be affected is soil. Groundwater withdrawal from proposed wells and use of water for development likewise would not affect geological resources in the Projects Area.

Several of the basins in the Projects Area contain unconsolidated sediment packages comprised of sand, silt, and gravel. Groundwater withdrawal could cause local subsidence where groundwater is removed from interstitial spaces in fine-grained sediment resulting in consolidation of sediment.

Fossil resources generally are considered to be vertebrate fossils. Although construction activities may result in loss or destruction of fossils, this region of Nevada is not known for significant (vertebrate) paleontological resources. If rare plant, vertebrate, or invertebrate fossils are discovered during construction, BLM would be contacted to determine steps necessary to preserve the fossils.

Seismic hazards could cause a rupture or failure of the pipelines or damage to related facilities but would not present a threat to public safety. All construction would be conducted using best management practices including appropriate pipe design and engineering techniques in accordance with all relevant codes.

Service Area

Geological resources in the Service Area would not be affected by development of housing, commercial buildings, and infrastructure that could result from delivery of water to the Stead/Lemmon Valley Area. Most land disturbance associated with developers activities in these areas would result in relatively shallow excavations for building foundations, roads, and community infrastructure. Construction materials (e.g., sand, gravel) may be present within the Stead/Lemmon Valley Area and future development may make use of such geologic resources once proper permits are obtained for such activities.

ALTERNATIVE A – CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

Implementation of Alternative A would result in impacts similar to those described for the Proposed Actions.

NO ACTION ALTERNATIVE

Common to Proposed Actions

Selection of the No Action Alternative would eliminate potential impacts associated with the Proposed Actions on geological resources, minerals, and paleontological resources.

MONITORING AND MITIGATION MEASURES

Measures Common to Proposed Actions

If rare plant, vertebrate, or invertebrate fossils are discovered during construction, BLM would be contacted to determine steps necessary to preserve the fossils.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Common to Proposed Actions

No irreversible or irretrievable commitment of geologic, mineral, or paleontological resources would result from the Proposed Actions or Alternatives.

RESIDUAL EFFECTS

Effects Common to Proposed Actions

No residual effects on geologic, mineral, or paleontological resources would result from construction of the pipelines and associated facilities.

AIR RESOURCES

SUMMARY

The Proposed Actions include the Fish Springs Ranch and Intermountain Water Supply proposals for construction of wells, water transmission pipelines, and associated components. The Fish Springs Ranch Proposed Action includes construction of an electrical substation on private land adjacent to the Alturas 345 kV transmission line. The Intermountain Water Supply Proposed Action would include construction of powerlines to facilities in Dry Valley and Bedell Flat. Construction activities would generate temporary emissions consisting primarily of fugitive dust (particulate matter) and gaseous engine emissions from drill rigs, construction equipment, and vehicles. Fugitive dust and gaseous emissions from the Proposed Actions would be emitted at or near ground level, would be short-term, and would not have the potential to affect air quality or visibility in any Class I areas.

Implementation of the Fish Springs Ranch Proposed Action would eliminate operation of existing diesel-powered electrical generators used to power groundwater pumps for irrigation and ranch operations thereby eliminating these sources of emissions.

Delivery of water to the Stead/Lemmon Valley Area would allow development to proceed in accordance with the Washoe County Regional Plan. Washoe County requires developers to obtain necessary air quality permits from Washoe County prior to construction. Emissions associated with commercial and housing infrastructure to be constructed in the Service Area as a result of water availability would likely increase in the Stead/Lemmon Valley Area, depending on Washoe County's air quality permit reviews and mitigation requirements associated with those permits.

DIRECT AND INDIRECT IMPACTS

Proposed Actions

Impacts Common to Proposed Actions

The Proposed Actions would include well drilling and construction of water transmission pipelines, pump stations, powerlines, and storage tanks. Construction activities would result in land disturbance which would generate road dust from traffic on paved and unpaved roads, fugitive dust, and gaseous emissions from drill rigs, construction equipment, and vehicles. Blasting would be a temporary source of particulate matter and gaseous pollution, if used during pipeline construction.

Particulate Emissions

Construction of pipelines and associated facilities would result in temporary emissions of fugitive dust containing PM_{10} and $PM_{2.5}$ particulate matter. Fugitive dust emissions would dissipate following completion of construction. Particulate matter from construction would be emitted at ambient temperature and at ground level. Dust would have little buoyancy and would not be expected to travel great distances from the generation site. Emissions from construction activities would not likely impact measurements at ambient PM_{10} and $PM_{2.5}$ monitors located in Reno and surrounding suburban areas nor travel far enough to impact the nearest Class I airshed.

Reduction in vegetative cover could occur in riparian/wetland areas located within predicted groundwater drawdown areas in Honey Lake Valley, Dry Valley, and Bedell Flat, resulting in potential areas of bare ground and, consequently, fugitive dust. This potential impact, however, is expected to be minor in the context of total vegetation in the three basins (see "*Vegetation Resources*" section in this chapter).

Gaseous Emissions

Temporary gaseous emissions would be generated during construction of the Projects, including sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NOx), and volatile organic compounds (VOC) from diesel-powered well-drilling and construction equipment. SO_2 emissions would be controlled by state and federal regulations which limit the amount of sulfur in diesel fuel. Other gaseous emissions from diesel engines would be minimized through proper operation and maintenance. If blasting is used for pipeline construction, ammonium nitrate and fuel oil (ANFO) would be a source of gaseous pollutants. ANFO blasting can cause fugitive emissions of NOx, CO, and SO_2.

Service Area

Delivery of water to the Stead/Lemmon Valley Area would allow development to proceed in accordance with the Washoe County Regional Plan. Construction of housing, roads, and community infrastructure to support build-out would result in increased automobile and truck traffic in developed areas. This traffic would increase gaseous emissions and fugitive dust in the Service Area.

Future development in the Service Area would require developers to obtain necessary air quality permits from Washoe County. Air quality permit applications include measures to reduce or eliminate air emissions from both construction and long-term activities associated with development. Fugitive emissions and gaseous emissions associated with commercial and housing infrastructure that would be constructed in the Service Area as a result of water availability would likely increase in the Stead/Lemmon Valley Area. The extent to which these emissions would increase over background or existing conditions would be addressed by Washoe County in air quality permit reviews and mitigation requirements of those permits.

Impacts Unique to Fish Springs Ranch Project

The Fish Springs Ranch proposal includes construction of an electrical substation on private land adjacent to the existing Alturas 345 kV transmission line. Electrical motors would replace existing diesel-fired well field pumps associated with irrigation wells at Fish Springs Ranch and provide power to the pump station, thereby eliminating gaseous emissions from these sources. Estimated reduction in NOx emissions resulting from elimination of the diesel-powered generators at Fish Springs Ranch would range up to 1,000 lbs/day during the irrigation season. In addition, installation of the electrical substation would eliminate all existing Fish Springs Ranch generator sets as emission sources to the airshed.

The Fish Springs Ranch plan for conversion (see Chapter 2) from current irrigation of alfalfa fields to non-irrigated range land would reduce or minimize potential for fugitive dust emissions from agricultural fields at the ranch. A self-sustaining vegetative cover included in the plan would bind soil materials to limit entrainment of soil by wind.

Impacts Unique to Intermountain Water Supply Project

Emissions from diesel-powered generators that would be operated as back-up systems at some of the production wells and pump stations would occur. These generator sets would be subject to Nevada's air quality permitting requirements as implemented and enforced by the Washoe County District Health Department Air Quality Management Division. Emissions from diesel generator sets would be short-term because they would be operated only in the event electrical power to the wells and booster stations is interrupted.

Back-up generators at selected Dry Valley production wells and the pump station would be typical 500 kVA (kilo-Volt-Amperes) units powered by 750-hp diesel engines. The Bedell Flat production wells would use typical 100 kVA generators powered by 105-hp diesel motors. Back-up generators would be tested for approximately one-half hour each week to ensure availability during an emergency. A conservative annual estimate of generator emergency operations has been based on <500 hours per year, which would not require a permit from Washoe County.

ALTERNATIVE A – CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

Particulate and gaseous emissions would be less under Alternative A as surface disturbance needed for pipeline construction would be less. Emissions from groundwater pumping equipment would remain at levels similar to the Proposed Actions.

NO ACTION ALTERNATIVE

No Action for Fish Springs Ranch Project

Selection of the No Action Alternative would eliminate potential impacts associated with Fish Springs Ranch's Proposed Action on air quality. Periodic gaseous emissions from operation of existing diesel-fired electrical generators for irrigation pumps likely would continue.

No Action for Intermountain Water Supply Project

Selection of the No Action Alternative would eliminate potential impacts associated with Intermountain Water Supply's Proposed Action on air quality.

MONITORING AND MITIGATION MEASURES

Measures Common to Proposed Actions

In addition to those measures outlined by the applicants in the Proposed Actions descriptions contained in Chapter 2, the following mitigation measures have been identified by BLM for construction of pipelines and associated facilities:

- Water would be added to active construction sites during weekends, nights, and holidays especially during windy conditions.
- Vehicles hauling soil or other loose materials that could be a source of dust emissions would be covered with a tarp or other means.
- Soil stabilizers would be applied to soil stockpiles to prevent wind erosion.
- Track-out elimination devices would be used on vehicles before entering paved roads.
- Public road surfaces would be washed or vacuumed to remove track-out.
- Traffic speeds would be limited on access roads and construction areas.
- Soil stabilizers would be applied to disturbed areas within five days of completion of activity at each site.
- Disturbed areas would be reclaimed as soon as practicable after completion of construction.

Additional monitoring and mitigation measures beyond those identified above may be required by the State of Nevada and/or Washoe County as part of their air quality permitting processes for developers in the Stead/Lemmon Valley Area.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Common to Proposed Actions

No irreversible or irretrievable commitment of air resources would result from the Proposed Actions or Alternatives.

RESIDUAL EFFECTS

Effects Common to Proposed Actions

No residual effects on air resources would be anticipated resulting from construction of the pipelines and associated facilities. Diesel-powered electrical generation equipment associated with the Intermountain Water Supply Project would only be used in response to loss of electrical power.

WATER RESOURCES

SUMMARY

Potential impacts to surface water and groundwater resources from the proposed Fish Springs Ranch and Intermountain Water Supply Rights-of-Way Projects are evaluated in this section. Groundwater would be removed at the proposed volumes as authorized by the State Engineer using production wells located in three basins: Honey Lake Valley = 8,000 acre-feet per year (af/yr); Dry Valley = 2,000 af/yr; and Bedell Flat = 500 af/yr. Water from the wells would be transported in buried pipelines to the Stead/Lemmon Valley Area north of Reno/Sparks.

General types of surface water impacts that may occur include: temporary disturbance of drainages during construction of the buried water transmission pipelines; accidental releases of hydraulic fluid, fuel, or oil; and reduced stream flow where groundwater drawdown from production well pumping is connected to surface water (e.g., springs). Potential impacts to groundwater from the Proposed Actions include: temporary and localized disturbance to areas of shallow groundwater intercepted by pipeline trenching; creation of a groundwater drawdown area around the pumping wells in each basin; land subsidence caused by lowering groundwater levels; and changes in salinity or total dissolved solids resulting from groundwater movement induced by the pumping wells.

DIRECT AND INDIRECT IMPACTS

Proposed Actions

Impacts Common to Proposed Actions

Water resource impacts common to the proposed Fish Springs Ranch and Intermountain Water Supply projects can be divided into three general categories: (1) impacts to surface water features resulting from installation of approximately 38 and 24 miles of underground piping for water transmission, respectively, and additional surface disturbance from wells, pump stations, storage tanks, and associated appurtenances; (2) impacts to groundwater and/or surface water resources resulting from groundwater withdrawal via wells in eastern Honey Lake Valley, western Dry Valley, and central Bedell Flat; and (3) impacts to water resources in areas where the water would be distributed (i.e., Service Area in Stead/Lemmon Valley Area).

The Proposed Actions would result in 395 acres of surface disturbance for the Fish Springs Ranch Project and 241 acres for the Intermountain Water Supply Project. Portions of the pipeline routes included in the Proposed Actions would occur adjacent to previously reclaimed land associated with the Tuscarora Natural Gas Pipeline.

Implementation of the Proposed Actions would allow inter-basin groundwater transfer of up to 8,000 af/yr from the Honey Lake Valley hydrographic area (no. 97), 2,000 af/yr from the Dry Valley hydrographic area (no. 95), and 500 af/yr from the Bedell Flat hydrographic area (no. 94) as authorized by the State Engineer.

Water Resource Impacts from Piping Installation

Separate water transmission pipelines for Fish Springs Ranch (38 miles) and Intermountain Water Supply (24 miles) would share the same right-of-way for approximately 13 miles (2 miles in Dry Valley, 6 miles in Bedell Flat, and 5 miles in Antelope Valley). Approximately 16 miles of the Fish Springs Ranch pipeline corridor, and 10 miles of the Intermountain Water Supply pipeline corridor would be located adjacent to the Tuscarora Gas Pipeline right-of-way (8 miles of this Tuscarora Gas Pipeline corridor would be shared by both Fish Springs Ranch and Intermountain Water Supply in portions of Dry Valley and Bedell Flat).

The proposed water transmission pipelines for Fish Springs Ranch and Intermountain Water Supply would cross approximately 70 drainage channels (**Figure 3-6**). The pipeline would be buried to depth of about 4 to 6 feet below ground surface, except at some of the larger stream channel crossings where burial depth may be greater to avoid channel scouring effects. These larger stream channel crossings likely would occur at Dry Valley Creek, North Fork Dry Valley Creek, and South Fork Dry Valley Creek. Most of the remaining drainages are small ephemeral channels that contain flow only during brief periods of sufficient rainfall and/or snowmelt.

Pipeline construction across some stream channels may occur when there is flow in the channels, which would require mitigation measures to prevent adverse impacts from erosion and sedimentation (see "*Monitoring and Mitigation Measures*" section). Time required to construct the pipeline across each stream channel would be short, followed by immediate reclamation to restore the channel to near pre-disturbance conditions. Based on USGS topographic maps, the following list indicates the number of stream channels that would be crossed by the shared water transmission pipeline corridors for Fish Springs Ranch and Intermountain Water Supply (**Figure 3-6**):

- *Dry Valley – Shared Pipeline Corridor (2 miles)*: 6 ephemeral channels + South Fork Dry Valley Creek; these locations are near the valley bottom where the channels do not have perennial flow.

- *Bedell Flat – Shared Pipeline Corridor (6 miles)*: 13 ephemeral channels; most locations are near the valley bottom where perennial flow does not occur.

- *Antelope Valley – Shared Pipeline Corridor (5 miles)*: no substantial drainage channel crossings.

Accidental releases of hydraulic fluid, fuel, or oil could impact surface water and/or groundwater if the releases occurred in or adjacent to a water body or in areas of shallow groundwater. Because of the minimal extent of surface water and shallow groundwater in the proposed construction areas, only minor localized impacts would likely occur if such releases occurred, assuming the releases are small volume (e.g., <100 gallons). Standard operating procedures and best management practices as part of all construction activities would minimize erosion and sedimentation impacts, as well as spills of petroleum products (see "*Monitoring and Mitigation Measures*" section).

No other impacts to groundwater and springs would be expected from proposed pipeline construction activities. Due to the relatively shallow pipeline burial depth, groundwater would not be encountered in most trenches, except in some valley bottoms where shallow groundwater is present in unconsolidated deposits. Pipeline construction in these areas could result in temporary and localized disturbance to the water table. The quality and quantity of this groundwater would not be diminished from this short-term disturbance.

Groundwater Impacts from Water Supply Well Pumping

Impacts to groundwater quality and quantity resulting from the proposed groundwater pumping wells in eastern Honey Lake Valley, west-central Dry Valley, and northwestern Bedell Flat have been estimated using computer groundwater models. Descriptions of the models and results are contained in the following sections: "*Impacts Unique to Fish Springs Ranch Project*" and "*Impacts Unique to Intermountain Water Supply Project*". Additionally, **Appendix C** contains summaries of groundwater models for the three basins, including figures showing results of groundwater drawdown predictions for years 1, 10, and 100.

In general, impacts to groundwater quantity would consist of removing groundwater at the proposed volumes from three basins (Honey Lake Valley, Dry Valley, and Bedell Flat) and transferring this water to the Lemmon Valley/Stead area. Proposed groundwater withdrawal rates are 8,000 af/yr for Honey Lake Valley, 2,000 af/yr for Dry Valley, and 500 af/yr for Bedell Flat. Groundwater removal would create a cone-of-depression (zone of influence) around the pumping wells in each basin, whereby the water table is lowered establishing a hydraulic gradient that allows groundwater to move to the wells. The magnitude and extent (vertical and lateral) of this cone-of-depression are dependent upon each well's pumping rate and hydraulic characteristics of the aquifer, including hydraulic conductivity, transmissivity, storativity, recharge and discharge locations, confining zones, and other boundary conditions.

A groundwater cone-of-depression would expand in time after startup and increase in pumping until a balance is reached between recharge and discharge within the radius of influence. As the water table adjusts to a new steady-state condition, groundwater storage decreases.

Groundwater models calculate and graphically depict the expanding cone-of-depression over time, as well as predict if and when drawdown ceases due to a balance between groundwater recharge and discharge. The models simulate withdrawal of groundwater from each pumping well on an annual basis, incorporating hydrologic balance information and aquifer characteristics. Several assumptions and estimations are used in the models; therefore, results should be considered approximations of future conditions based on one or more pumping scenarios. The models used for this EIS are widely accepted in the scientific community and the results are based on best available data. Selected comments on the previous models completed for Honey Lake Valley are summarized in **Appendix C**.

Groundwater models also can be used to simulate water quality changes that may result from pumping. For this Project, however, potential changes to groundwater quality were not predicted using numeric models, but were evaluated using existing water quality data and analyses. In general, potential groundwater quality impacts are associated primarily with changes in salinity or total dissolved solids (TDS) resulting from groundwater movement induced by the pumping wells. These effects are described for each basin in the following sections: "*Impacts Unique to Fish Springs Ranch Project*" and "*Impacts Unique to Intermountain Water Supply Project*".

Lowering groundwater levels due to pumping can cause ground subsidence within the cone-of-depression or zone of influence. Subsidence can only occur where groundwater drawdown occurs in unconsolidated sediments, namely valley fill deposits in Honey Lake Valley, Dry Valley, and Bedell Flat. For the "Bedell Flat Pipelines Rights-of-Way Draft EIS" (BLM 1993), a range of subsidence was estimated using assumed rock properties, including an extensive deposit of compressible sandstone, siltstone, and claystone. Ground fissures have been reported approximately 6 miles north of Fish Springs Ranch (BLM 1993). These fissures may have been caused by irrigation pumping that has been occurring at Fish Springs Ranch, fault creep, and/or desiccation cracks caused by prolonged drought.

Subsidence can damage buildings by cracking foundations. As there are few buildings (houses, barns, garages, etc.) on valley fill deposits in eastern Honey Lake Valley, Dry Valley, or Bedell Flat, the potential for impacts to foundations is minimal. A housing subdivision is located in southern Bedell Flat (Red Rock Estates). Groundwater drawdown predicted for this area (up to 9 feet) would occur in bedrock (incompressible) rather than valley fill deposits.

Using methodology described by BLM (1993) in the "Bedell Flat Pipelines Rights-of-Way Draft EIS", up to about 2 feet of subsidence could occur within a radius of approximately 2 miles from the Fish Springs Ranch production wells using a withdrawal rate of 8,000 af/yr. This assumes silty sand is the predominant material for valley fill. Potential subsidence would increase for areas where clay is the predominant material (not common over large areas in Projects Area). Subsidence decreases logarithmically from the center of groundwater pumping (BLM 1993); therefore, there is little potential for subsidence beyond about 2 miles from the proposed pumping wells. Subsidence could also occur with continued pumping at Fish Springs Ranch for irrigation purposes.

Surface Water Impacts from Water Supply Well Pumping

Impacts to surface water quantity and/or quality can occur from groundwater pumping in areas where groundwater is connected to surface water. Such connections can occur where sufficient flow from springs, seeps, or artesian-flowing wells contribute to surface water flow downgradient from the discharge points. In addition, some streams gain flow where channels intersect the groundwater table. Some of these groundwater discharges occur only seasonally when the water table is highest, usually during spring. As the cone-of-depression in groundwater expands around the pumping well(s), discharge at springs, seeps, and/or stream channels within the zone of influence may decrease or cease.

Impacts to surface water quality could result if groundwater pumping causes poorer quality groundwater to move from portions of the groundwater system not associated with surface water to areas where groundwater discharges to surface water. In these cases, springs or streams could experience higher concentrations of TDS and salinity. Potential effects to surface water quantity and/or quality are described for each basin in the following sections: "*Impacts Unique to Fish Springs Ranch Project*" and "*Impacts Unique to Intermountain Water Supply Project*".

Service Area

Delivery of water to the Stead/Lemmon Valley Area would allow development to proceed in accordance with the Washoe County Regional Plan. Construction of housing, roads, and community infrastructure to support build-out would result in increased water use and waste water disposal in developed areas. Increased populations in the Service Area would result in several potential water-related effects, including: interbasin transfer of water; increased recharge to groundwater from lawn irrigation and septic systems; increased nutrient loading to groundwater and possibly surface water from infiltration of septic water; erosion and sedimentation from construction activities; increased surface runoff due to construction of impervious surfaces; and increased flow in the Truckee River due to less demand for surface water. Some individual domestic wells and septic systems could be replaced with community water supply and sewage treatment systems.

Future development in the Service Area would require developers to obtain necessary water-related permits from Washoe County. Such permits may include design requirements and/or measures to reduce or eliminate water quality impacts, such as from septic systems. Some construction activities likely would require storm water control permits that specify measures to control erosion and sedimentation to waterways.

Impacts Unique to Fish Springs Ranch Project

Groundwater would be pumped at up to 8,000 af/yr from six supply wells in southeastern Honey Lake Valley in the Fish Springs Ranch area (**Figure 3-1**). For purposes of comparison, baseline conditions are assumed to occur in 2003 where groundwater pumping from five irrigation wells at Fish Springs Ranch occurred at a total rate of about 4,200 af/yr.

Groundwater Impacts for Fish Springs Ranch Project

Groundwater Quantity

Several groundwater models have been developed for eastern Honey Lake Valley over the past 15 years. Summaries of these models are included in **Appendix C**. In 1990, the USGS (Handman *et al.* 1990) developed a four-layer finite difference flow model using MODFLOW®. This model was used by the USGS to simulate withdrawal of groundwater from five irrigation wells at a rate of 5,900 af/yr for 1988 baseline conditions, and withdrawal from 18 wells at a rate of 15,000 af/yr for potential development conditions.

The original USGS MODFLOW model for eastern Honey Lake Valley was modified in 1993 for the "Bedell Flat Pipelines Rights-of-Way Draft EIS" (BLM 1993), simulating 13,000 af/yr of groundwater withdrawal from wells at Fish Springs Ranch and 2,000 af/yr from wells at the Sierra Army Depot. The 1993 model extended the model boundary approximately 3 miles to the west relative to the 1990 USGS model boundary to incorporate the Depot. Moll (2000) completed a new MODFLOW model for southeastern Honey Lake Valley as part of an M.S. Thesis for the University of Nevada-Reno.

William E. Nork, Inc. (1991) developed a finite-element model for eastern Honey Lake Valley. A solute transport model was completed by Bohm (1991) to evaluate effects of pumping on groundwater quality at Fish Springs Ranch. The groundwater flow model completed for the "Bedell Flat Pipelines Rights-of-Way Draft EIS" (BLM 1993) also includes a solute transport model to evaluate groundwater quality effects from pumping.

Comments on the original 1990 USGS model and modified 1993 model have been documented by Mayo and Slosson (1991, 1992) and Principia Mathematica Inc. (1993). Summaries of these reports are included in **Appendix C**.

In 2004 and 2005, Lahontan GeoScience, Inc. (Lahontan 2004, 2005) modified the original 1990 USGS MODFLOW model to simulate pumping groundwater from six wells at Fish Springs Ranch at a combined rate of 8,000 af/yr. The 2005 model shifted the western model boundary approximately 5 miles to the east relative to the original 1990 USGS model boundary (because of a groundwater divide identified at this location), and used general head boundary cells to represent the southern half of the western model boundary.

Results of Lahontan's 2005 model are presented in this EIS to represent the Proposed Action pumping for Fish Springs Ranch (i.e., 8,000 af/yr). Prior to completing this model, Lahontan (2000) ran the original 1990 USGS MODFLOW model at pumping rates of 5,900 af/yr (1988 conditions), 8,000 af/yr, 10,000 af/yr, and 15,000 af/yr using the same hydrologic data used by the USGS (Handman *et al.* 1990). In 2003, Lahontan (2003) completed a sensitivity analysis of predicted groundwater outflow to Pyramid Lake Valley using the 1990 USGS version of the MODFLOW model.

Hydrologic budgets used in Lahontan's 2005 predictive groundwater model (Proposed Action at 10 years, 100 years, and steady-state) and for baseline conditions (2003) are presented in **Table 4-1**. These water budgets show that total recharge and discharge rates are similar between the baseline condition in 2003 and the Proposed Action of increasing total pumping rates to 8,000 af/yr from six production wells (**Figure 4-1**). For the Proposed Action, there would be no irrigation return flow which will reduce this recharge. During the first 10 years of pumping and beyond, however, recharge increased from release of groundwater in storage.

TABLE 4-1
Hydrologic Budget for Groundwater Flow Model at Eastern Honey Lake Valley

Budget Components	Estimated Quantity (acre-feet per year)			
	2003 Baseline Conditions	Proposed Action Conditions at 8,000 af/yr Pumping (10 years)	Proposed Action Conditions at 8,000 af/yr Pumping (100 years)	Proposed Action Conditions at 8,000 af/yr Pumping (steady-state)
RECHARGE				
Release from Storage	0	3,164	646	0
Direct Infiltration of Precipitation	8,411	8,411	8,411	8,411
Infiltration of Surface Runoff	11,890	11,890	11,890	11,886
Irrigation Return	1,046	0	0	0
Groundwater Inflow from West (Honey Lake Area)	30	33	34	31
TOTAL RECHARGE	21,377	23,498	20,981	20,328
DISCHARGE				
Groundwater Taken Into Storage	0	36	0	0
Groundwater Evapotranspiration	10,400	8,634	6,664	6,280
Withdrawal from Production Wells	4,202	7,997	7,997	7,997
Groundwater Outflow NE to Smoke Creek Desert via Sand Pass	5,278	5,247	4,829	4,707
Groundwater Outflow East to Pyramid Lake Valley via Astor Pass	1,481	1,436	1,341	1,328
Groundwater Outflow West to Honey Lake Area	17	16	16	16
TOTAL DISCHARGE	21,378	23,366	20,847	20,328

Source: Lahontan 2005.

For discharge components, the Proposed Action uses a lower groundwater evapotranspiration rate (6,280 to 8,634 af/yr) versus the rate estimated for 2003 baseline conditions (10,400 af/yr). This difference is due to declining evapotranspiration as the water table is lowered from pumping 8,000 af/yr. The 2005 model incorporates changes in the extinction depths for phreatophytes (30 feet everywhere except 12 feet in playas, versus 24 feet for most of the 1990 USGS model area) and the maximum evapotranspiration rate (40 in/yr versus 48 in/yr used in the 1990 USGS model) (Handman *et al.* 1990; Walker & Associates 2004). Groundwater extraction increases from about 4,200 af/yr for 2003 baseline conditions, to 8,000 af/yr for the Proposed Action.

Historical groundwater use since the mid-1980s at Fish Springs Ranch has consisted primarily of pumping from five wells (Hodges, Wilson/Ford, Headquarters, Jarboe, and Ferrel) for irrigation purposes (**Figure 3-5**). **Table 4-2** shows pumping rates from these wells for 2003 which total about 4,200 af/yr. Estimated irrigation return flow for this water usage also is shown in **Table 4-2**.

TABLE 4-2
Existing and Proposed Pumping Rates at Fish Springs Ranch

Well	Total Pumping Vol. (af/yr)	Pumping Vol. from Model Layer 1 (af/yr)	Pumping Vol. from Model Layer 2 (af/yr)	Irrigation Return Flow (af/yr)
Irrigation Pumping at Fish Springs Ranch in 2003 (Baseline Condition)				
Hodges	544	544	0	136
Wilson	1,005	0	1,005	251
Headquarters	1,549	1,146	403	387
Jarboe	712	356	356	178
Ferrel	377	377	0	94
TOTAL	4,187	2,423	1,764	1,046 (25% of pumping)
Proposed Action Pumping at Fish Springs Ranch				
Hodges	2,000	668	1,332	0
Wilson	2,000	668	1,332	0
Headquarters	2,000	668	1,332	0
Jarboe	1,200	400	800	0
Ferrel	800	266	534	0
TOTAL	8,000	2,670	5,330	0

Source: Lahontan 2004
Note: See **Figure 3-5** for locations of irrigation wells.

Appendix F contains hydrographs showing water levels over the period of record for the irrigation wells and some of the monitoring wells shown on **Figure 3-5**. The irrigation wells and nearby monitoring wells show definite groundwater drawdown during the pumping period, followed by recovery to similar static water levels during the non-pumping periods. The Sand Pass and Astor Pass monitoring wells show a slight declining trend of about 2 feet over the period of record (1990-2004). Also included in **Appendix F** are estimates of annual irrigation pumping rates for Fish Springs Ranch from 1988 through 2003. Average annual pumping rate for that period of record is about 4,600 af/yr, with a range of 4,100 to 5,900 af/yr.

Table 4-2 shows the amount of water that would be pumped from each of the upper two model layers (aquifers). Approximately one-third of project pumping was assigned to Layer 1 and two-thirds to Layer 2. Layer 1 includes the upper water table aquifer ranging from approximately 3700 to 4050 feet in

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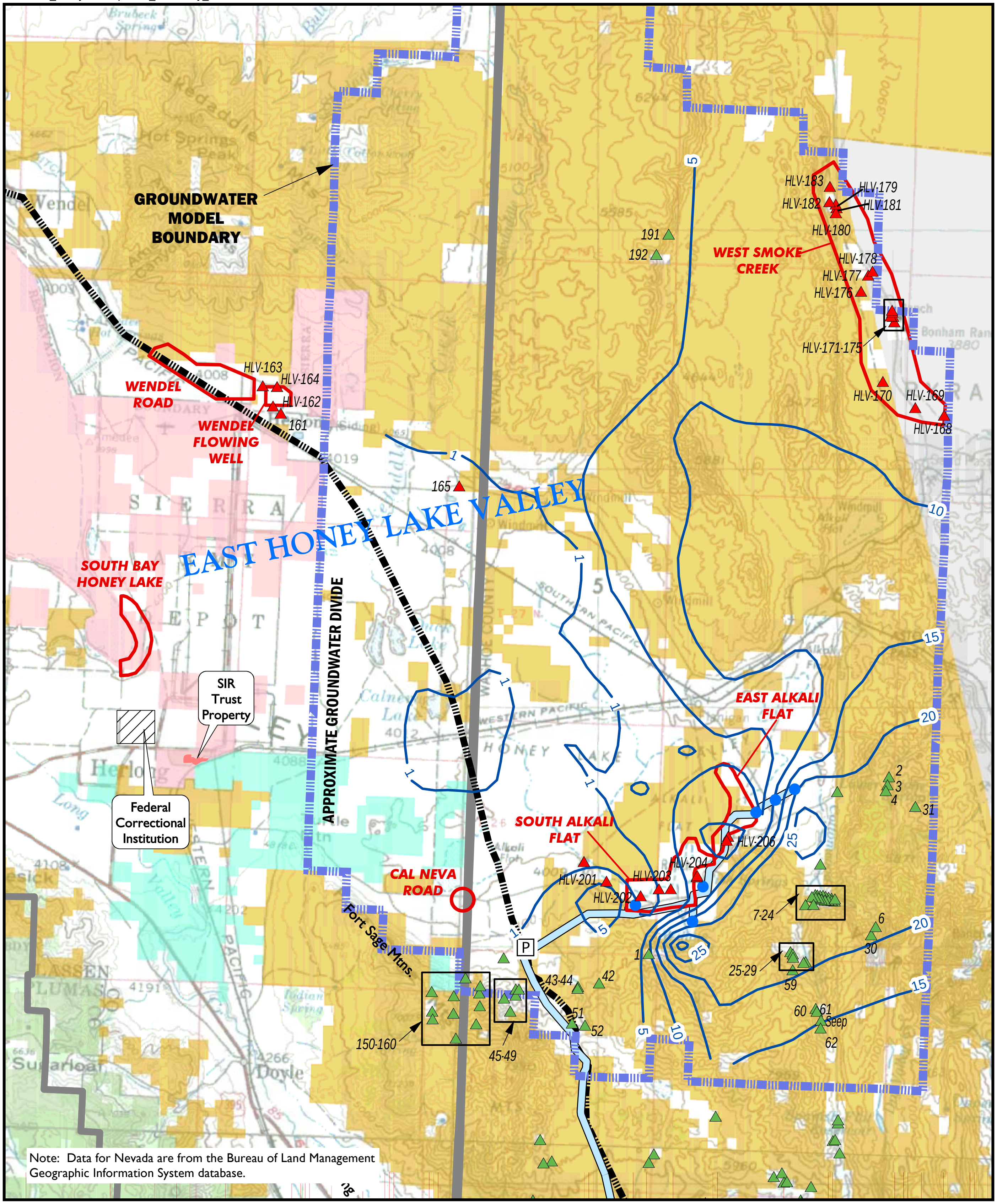


P Proposed Pump Station
Proposed Pumping Wells
Proposed Pipeline Route
Tuscarora Natural Gas Pipeline
Spring or Seep > 4100 ft. Elev.
Spring or Seep < 4100 ft. Elev.
Contour of Predicted Maximum Drawdown (feet) In Layer 1 After Pumping 8,000 acre-feet/yr

Public Ownership
- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- Forest Service
- State of California
- Susanville Indian Ranchera (SIR)
- Potential Habitat for Carson Wandering Skipper

0 Miles 4

Maximum Groundwater Drawdown at Steady State Predicted in East Honey Lake Valley
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 4-1

elevation, consisting of fine-grained deposits (clay, silt, sand) in the center of the basin, and coarser-grained alluvial deposits (silt, sand, gravel) that surround the valley floor at the base of the mountains. Layer 2 consists almost entirely of fine-grained lake-bed sediments except where volcanic rocks are present, all of which range in elevation from about 3000 to 3700 feet amsl.

The proposed pumping rate of 8,000 af/yr from six production wells at Fish Springs Ranch is predicted to cause drawdown of the water table in eastern Honey Lake Valley. Maximum steady-state groundwater drawdown contours for 8,000 af/yr pumping are shown on **Figure 4-1**. The drawdown is calculated by subtracting predicted groundwater surface elevations from baseline conditions in 2003 where net irrigation withdrawals at Fish Springs Ranch were about 3,100 af/yr (total withdrawal minus return flow; **Table 4-2**).

Based on recent model predictions using a total groundwater pumping rate of 8,000 af/yr (Lahontan 2005), the amount of groundwater drawdown would be up to about 30 feet (at 100 years) near the production wells at Fish Springs Ranch, to <1 foot at distances of about 1 to 5 miles west and north of the production wells (**Figure 4-1**). Maximum drawdown at the state-line would be about 1 foot or less, with no drawdown predicted more than 4 miles west of the state-line, coincident with the groundwater divide shown on **Figure 4-1** (Lahontan 2005). No groundwater level impacts would occur to Honey Lake and the Sierra Army Depot area which are about 5 to 10 miles west of the state-line. Maximum drawdown predicted at Astor Pass near Pyramid Lake Valley, and Sand Pass near Smoke Creek Desert, would be approximately 15 feet and 10 feet, respectively.

Figures C-1 and **C-2** (**Appendix C**) are hydrographs of groundwater drawdown versus time (0 to 100 years) developed using Lahontan's 2005 model for a well in the Sand Pass and Astor Pass area and a well in the Fish Springs Ranch area, respectively. Predicted drawdown in the Pass area well is about 1 foot at year 10, and 9 feet at year 100. Predicted drawdown in the Ranch area well is about 6 feet of drawdown at year 1, and 15 feet at year 100; this well is not located in the area of maximum groundwater drawdown at Fish Springs Ranch. **Figures C-3, C-4,** and **C-5** (**Appendix C**) show the distribution of groundwater drawdown in Layer 1 throughout eastern Honey Lake Valley in plan view for 1, 10, and 100 years, respectively, after initiation of pumping 8,000 af/yr. According to Lahontan (2005), 95 percent of total groundwater drawdown in the pumping center is achieved after 100 years of pumping.

The groundwater model predicts outflow to Pyramid Lake Valley via Astor Pass would be reduced by up to about 150 af/yr or 10 percent of baseline conditions (**Table 4-1**). Approximately 1,500 af/yr of groundwater is estimated to flow naturally from eastern Honey Lake Valley eastward to Pyramid Lake Valley (Handman *et al.* 1990). According to Lopes and Evetts (2004) of the USGS, total natural groundwater recharge in Pyramid Lake Valley is 6,600 af/yr. The predicted groundwater flow reduction of 150 af/yr to Pyramid Lake Valley from proposed pumping at Fish Springs Ranch, therefore, is about 2 percent of total groundwater recharge in Pyramid Lake Valley. According to the USGS (Lopes and Evetts 2004), current groundwater pumping in Pyramid Lake Valley totals about 380 af/yr.

It is not known how much groundwater flow in Pyramid Lake Valley recharges Pyramid Lake; however, it is likely that the lake is a major discharge point for groundwater recharged from the surrounding mountains. The model is based on a lake elevation measured in 1988 (3792 feet); however, if the current higher elevation of the lake (3810 feet in July 2003) was used in the model, the predicted outflow to Pyramid Lake Valley via Astor Pass would decrease.

Average annual flow of the Truckee River into Pyramid Lake is approximately 410,000 af/yr for the period of 1958-2002, with a range of 17,000 to 2,000,000 af/yr (USGS 2005). The predicted reduction of 150 af/yr from the proposed pumping at Fish Springs Ranch is about 0.04 percent of the average annual Truckee River flow into Pyramid Lake, and about 0.8 percent of the lowest annual stream flow recorded.

Groundwater outflow to Smoke Creek Desert via Sand Pass would be reduced by about 570 af/yr or 11 percent of baseline conditions (**Table 4-1**). Approximately 5,300 af/yr of groundwater is estimated to flow naturally from eastern Honey Lake Valley northeastward to Smoke Creek Desert (Handman *et al.* 1990). According to Lopes and Evetts (2004) of the USGS, total natural groundwater recharge in Smoke Creek Desert is 13,000 af/yr. The predicted groundwater flow reduction of 570 af/yr to Smoke Creek Desert from proposed pumping at Fish Springs Ranch, therefore, is about 4 percent of total groundwater recharge in Smoke Creek Desert. According to the USGS (Lopes and Evetts 2004), current groundwater pumping in Smoke Creek Desert totals 920 af/yr.

An estimated 2,600 af/yr of groundwater may flow from Smoke Creek Desert to Pyramid Lake Valley (BLM 1993). The proposed pumping at Fish Springs Ranch could eventually reduce this amount by about 500 af/yr based on a proportion of the reduction estimated by BLM (1993) for pumping 13,000 af/yr. If 500 af/yr is added to the reduction of 150 af/yr described previously for the Proposed Action, total groundwater flow reduction to Pyramid Lake Valley could be 650 af/yr, or about 10 percent of total groundwater recharge (6,600 af/yr) estimated for Pyramid Lake Valley.

Some investigators of the eastern Honey Lake Valley hydrologic system believe there is little or no groundwater flow to Smoke Creek Desert and Pyramid Lake Valley (Bohm 1990; Moll 2000; Varian 1997). If this is the case (i.e., no-flow boundary at the eastern basin margin), then the proposed pumping at Fish Springs Ranch likely would not affect groundwater in these basins, and the water balance for Honey Lake Valley would need to be adjusted for reduced outflow from the basin. Moll (2000) excluded groundwater flow to Smoke Creek Desert and Pyramid Lake Valley from her model (i.e., no flow boundary along east side of model area) with groundwater drawdown predictions in eastern Honey Lake Valley that are similar to those presented in **Figure 4-1** for the Proposed Action using a pumping rate of 8,000 af/yr.

Groundwater Quality

As stated previously, potential groundwater quality impacts are associated primarily with changes in salinity or TDS resulting from groundwater movement induced by the pumping wells. For eastern

Honey Lake Valley, sodium, chloride and TDS increase toward the center of the basin; the playa areas are groundwater sinks where evaporation causes high salinity. TDS concentrations in groundwater near the eastern Honey Lake Valley playa area are up to 50,000 mg/L (BLM 1993). In the vicinity of the proposed Fish Springs Ranch production wells southeast of the playa, TDS in groundwater ranges from about 200 to 500 mg/L. Groundwater in the Sand Pass and Astor Pass areas has TDS in the range of 1,600 to 2,500 mg/L (BLM 1993). Concentrations of metals from the Fish Springs Ranch irrigation wells are low; however, arsenic is elevated (0.039 mg/L versus standard of 0.01 mg/L to be implemented in January 2006) in the well located nearest the playa (Wilson well).

A water quality model was completed for the “Bedell Flat Pipelines Rights-of-Way Draft EIS” (BLM 1993) to predict changes in groundwater quality in eastern Honey Lake Valley. Results of this analysis show that TDS would increase by about 100 mg/L about 2 miles east of the center of Honey Lake Valley playa 100 years after initiation of pumping 13,000 af/yr at Fish Springs Ranch. TDS to the east and south of the playa boundary would increase less than 60 mg/L and 40 mg/L, respectively (BLM 1993). A slight increase in TDS at Astor Pass averaging 40 mg/L is predicted for the 13,000 af/yr pumping rate; however, no TDS increases would occur at the Sand Pass area (BLM 1993). Given these TDS increases predicted for a pumping rate of 13,000 af/yr, the proposed pumping rate of 8,000 af/yr for the current Proposed Action would be expected to result in lower TDS increases, possibly in the range of about 40 percent compared to the concentration changes discussed above.

<u>Sierra Army Depot Area</u>

Concern has been raised by the U.S. Army that pumping at Fish Springs Ranch could adversely affect groundwater remediation activities at the Sierra Army Depot in central Honey Lake Valley, California. Groundwater contamination studies and remediation activities have been on-going for over 10 years at the Sierra Army Depot, primarily as a result of historic releases of petroleum products and solvents. Results of the 2005 groundwater model for Fish Springs Ranch pumping shows that no drawdown would occur in the Sierra Army Depot area at a pumping rate of 8,000 af/yr (**Figure 4-1**). Location of the Depot’s groundwater contamination areas (Sierra Army Depot 2005) are approximately 5 to 6 miles west of the state-line, or 1 to 2 miles west of the maximum predicted groundwater drawdown area shown on **Figure 4-1** for proposed Fish Springs Ranch pumping at 8,000 af/yr. The groundwater drawdown area would take over 100 years to expand to that maximum location (see **Figures C-3, C-4,** and **C-5** in **Appendix C**), so the contaminated groundwater areas at the Depot could be remediated by that time. Two production wells for the Herlong Water and Wastewater Project were installed approximately 3½ miles west of Herlong and will be pumped initially at rates of about 1,300 af/yr (108 af/month) and may have an affect on groundwater flow direction in the Depot area.

Impacts to Springs for Fish Springs Ranch Project

Table 4-3 describes springs that could be impacted by proposed pumping at Fish Springs Ranch. These features are shown on **Figure 4-1**, along with the model prediction of groundwater drawdown contours. Flowing wells that were identified in the field are also include in **Table 4-3** and **Figure 4-1**, even though they are man-caused groundwater discharges that could be eliminated with proper plugging and capping procedures. As such, changes to flow and wetland habitat at flowing wells could change due to plugging and capping. Only those springs and flowing wells located within the groundwater zone of influence and below an elevation of 4100 feet amsl are considered for this impact analysis because the regional water table in eastern Honey Lake Valley has an uppermost elevation of about 4050 feet amsl (i.e., used for Layer 1 in model). Springs and flowing wells located above this elevation are assumed to be associated with localized groundwater systems in the mountains that are not connected to the regional valley flow systems.

Potential impacts to springs and flowing wells include reduced or eliminated flow, changes in water quality, and reduced riparian vegetation if present. The riparian or wetland habitat zones could be adversely affected by the proposed pumping if groundwater is lowered below the rooting depth for riparian plants (see "*Vegetation Resources*" section in this chapter). The magnitude of impact to a spring or flowing well, if any, would depend on: (1) whether the source of water would be connected to the aquifer supplying water to the production wells; (2) magnitude of drawdown in relation to the hydraulic head at the spring or well; and (3) location of poorer quality groundwater in proximity to the spring or well.

Two general categories of springs and wells are presented in **Table 4-3**: (1) spring or flowing well is present, along with a riparian zone; and (2) spring or well has ceased flowing, but a riparian zone is present. The primary group of flowing springs and wells that could be affected by groundwater pumping at Fish Springs Ranch consists of the 10 wells and five springs located in southern Smoke Creek Desert (HLV-168 through HLV-183, excluding HLV-170 and HLV-181, in **Table 4-3** and on **Figure 4-1**). According to groundwater model results, all of the noted springs and wells in southern Smoke Creek Desert may be subject to 5 to 10 feet of groundwater drawdown due to the proposed pumping of 8,000 af/yr. Most of these sites have thermal water discharges at flow rates of <1 to 145 gal/min. Assuming 5 to 10 feet of drawdown does eventually occur in this part of Smoke Creek Desert, the flowing springs and wells could experience flow reductions.

Total riparian or wetland area associated with the springs and flowing well sites in eastern Honey Lake Valley, including southern Smoke Creek Desert, is approximately 13 acres (Westech 2004a). Most of this area (approximately 9 acres) is in the southern Smoke Creek Desert area, located over 10 miles from proposed pumping wells at Fish Springs Ranch. Flow from springs and/or wells could be reduced depending on their connection with the regional aquifer subject to pumping at Fish Springs Ranch, and the head or water pressure at each spring and flowing well. About 10 acres of riparian/wetland habitat are presented in **Table 4-3** as potentially being affected by proposed groundwater pumping at Fish Springs Ranch. It is expected that less than half of these areas would experience adverse effects from groundwater pumping because of the distance from pumping wells to the springs/flowing wells, and/or the lack of connection to the regional groundwater system. Lowering groundwater levels caused by the proposed production wells would occur gradually over a period of 100 years or more.

TABLE 4-3
Springs and Flowing Wells That Could Be Affected by Groundwater Drawdown From Proposed Action Pumping at Fish Springs Ranch

Spring or Flowing Well Name/Number	Location	Elevation (feet)	Water Source	Site Description
Spring or Flowing Well is Present, Along with Riparian/Wetland Zone				
Located Between 5 and 10 foot Drawdown Contours Predicted by Model for 8,000 af/yr Pumping				
15 Springs or Flowing Wells in Southern Smoke Creek Desert: HLV-168 through HLV-183	Sec. 19 & 20, T28N, R20E; Sec. 1,2,12 & 13, T28N, R19E; Sec. 22, 26 & 27, T29N, R19E. Seven of these sites are on public land.	3870 – 3990	HLV-168: spring 1 gpm; no outflow. HLV-169: well or spring 5 gpm; water in channel. HLV-171: flowing well 50 gpm. HLV-172: flowing well >100 gpm. HLV-173: two flowing wells >100 gpm. HLV-174: flowing well 2 gpm. HLV-175: flowing well >50 gpm. HLV-176: flowing well 5-10 gpm. HLV-177: spring 3-5 gpm. HLV-178: flowing well 1-2 gpm. HLV-179: flowing well/spring >50 gpm. HLV-180: spring <5 gpm. HLV-182: seep-spring. HLV-183: spring <1 gpm.	10 flowing wells and 5 springs in Smoke Creek Desert; most of these have herbaceous wetland-type habitat totaling about 9 acres (Westech 2004a), with some ponds and flowing aquatic habitat; all sites have low to medium habitat quality for TES butterfly species (Sanford 2004a), but no special status butterflies were identified (Sanford 2004b); most well discharges are thermal with temperatures of up to 48° C; flow rates ranged from <1 - 145 gpm in 1990.
Located Between 0 and 5 foot Drawdown Contours Predicted by Model for 8,000 af/yr Pumping				
Spring HLV-165, High Rock Spring	SE,SW¼ Sec. 25, T28N, R17E. Located on public land near private land boundary.	4040	Major spring flowing 810 gpm in 1990, with water temperature of 27°C (JBR Consultants 1990b). Water may be associated with fracture zone that supplies water to this part of Honey Lake Valley.	At High Rock Ranch inside California border; no access by Westech in 2004. Unknown wetland habitat. This spring is located near the zero-drawdown contour line as predicted by the model.
Spring or Well has Ceased Flowing, But Riparian/Wetland Zone is Present				
Located Between 15 and 20 foot Drawdown Contours Predicted by Model for 8,000 af/yr Pumping				
Spring/Seep HLV-206	SW,SE¼ Sec. 17, T26N, R19E. Located on private land.	3980	Depressional wetland; no surface water flow; former spring likely ceased flowing; water source for wetland appears to be shallow groundwater.	Herbaceous depression wetland habitat <0.1 acre; this site has two springs on Exhibit 5 in Westech (2004a) report which likely are just a single site; this site is located in East Alkali Flat survey area as medium quality habitat for TES butterfly (Sanford 2004a).
Located Between 10 and 15 foot Drawdown Contours Predicted by Model for 8,000 af/yr Pumping				
Capped Well HLV-203 Ferrel Playa Well	NW,NW¼ Sec. 30, T26N, R19E. Located on private land.	3980	Minor surface water flow into wetland/pond area; capped flowing well appears to leak some water at ground surface around casing, supporting nearby wetlands.	Pond and herbaceous wetland near capped well and in nearby drainage channel; 0.2 acre wetland habitat (Westech 2004a); this site is located in South Alkali Flat survey area as medium quality habitat for TES butterfly (Sanford 2004a).
Well HLV-202 (dry), Lime Rock Well	SW,NE¼ Sec. 25, T26N, R18E. Located on private land.	3980	Former well site; no well casing found; small wetland area for which groundwater is likely source; no surface water flow.	Dry well that formerly supplied trough; stopped flowing many years ago; herbaceous wetland habitat <0.01 acre (Westech 2004a); this site is located in South Alkali Flat survey area as medium quality habitat for TES butterfly (Sanford 2004a).

TABLE 4-3 (continued) Springs and Flowing Wells That Could Be Affected by Groundwater Drawdown From Proposed Action Pumping at Fish Springs Ranch				
Spring or Flowing Well Name/Number	**Location**	**Elevation (feet)**	**Water Source**	**Site Description**
Located Between 0 and 5 foot Drawdown Contours Predicted by Model for 8,000 af/yr Pumping				
Flowing Well HLV-201 (dry), Desert Well	NW,NE¼ Sec. 26, T26N, R18E. Located on public land near private land boundary.	3980	Dry well; small wetland area along channel; no surface water flow.	Dry well that formerly supplied water tank; stopped flowing many years ago; herbaceous wetland habitat <0.01 acre (Westech 2004a).

Note:

1. Groundwater drawdown contours obtained from groundwater flow model performed by Lahontan (2005).
2. Locations of springs and flowing wells obtained from Westech (2004a) and JBR Consultants Group (1990a, 1990b).
3. Threatened/endangered species (TES) butterfly (i.e., Carson wandering skipper) habitat information from Sanford (2004a, 2004b).
4. This table only lists springs located at elevations below 4,100 feet elevation in eastern Honey Lake Valley and Smoke Creek Desert, above which the springs are assumed to be from local perched groundwater flow systems in mountains that would not be affected by proposed pumping at Fish Springs Ranch.
5. See **Figure 4-1** for locations of springs and flowing wells.
6. Sec. = Section; T = Township; R = Range; gpm = gallons per minute; USGS = U.S. Geological Survey.

One flowing spring site that could be subject to groundwater drawdown (<1 foot) is located at the High Rock Ranch just inside the California border (Spring HLV-165; **Figure 4-1**). This spring had a measured flow of 810 gal/min and warm temperature in 1990 (JBR Consultants Group 1990b). Little or no impact to flow is expected at this spring site, however, because it is near the zero drawdown contour line as predicted by the model (**Figure 4-1**), and the spring is assumed to be under substantial pressure, possibly related to a fault structure in the basin.

One spring site (HLV-206) is located between the projected 15- and 20-foot groundwater drawdown contours (**Figure 4-1**), but there was no flow observed in 2004 (Westech 2004a). A small (<0.1 acre) depressional wetland habitat area is present at this site which is assumed to be maintained by shallow groundwater which may not be affected by groundwater pumping at Fish Springs Ranch.

Two additional historically flowing well sites (HLV-202 and HLV-203) are located between the 10- to 15-foot groundwater drawdown contours as predicted by the model (**Figure 4-1**). One additional historical flowing well (HLV-201) is located between the 0 and 5-foot drawdown contours. Based on field observations by Westech (2004a), however, these wells are no longer flowing. The three sites have the following observed riparian or wetland areas: HLV-201 = <0.01 acre, HLV-202 = <0.01 acre, and HLV-203 = 0.2 acre (Westech 2004a). Riparian vegetation along a drainage channel at site HLV-201 appears to be maintained by intermittent water in the channel and possibly some subsurface water in channel alluvium. Riparian vegetation at site HLV-202 appears to be maintained by shallow groundwater that may not be affected by proposed groundwater pumping. Riparian vegetation at site HLV-203 appears to be supported by some surface water in Anderson Canyon and from a leaking capped well.

This site could be adversely affected if groundwater drawdown substantially lowers the well's water level.

Most potential impacts described above are related to flowing wells or historically flowing wells, rather than springs. As previously mentioned, flowing wells that are not being used for beneficial purposes should be properly plugged and abandoned to prevent discharge of water. As such, potential impacts to these man-caused flowing wells and associated wetland habitat from proposed groundwater pumping at Fish Springs Ranch are acknowledged as being subject to change from plugging and capping procedures and requirements.

Lowering groundwater levels due to production well pumping at Fish Springs Ranch would occur gradually over a period of 100 years or more. Fish Springs (HLV-204), Lime Rock Well (HLV-202), and Desert Well (HLV-201) have ceased flowing in about the last 10 to 20 years, likely due, at least in part, to pumping from irrigation wells at Fish Springs Ranch. As described previously under "*Groundwater Impacts*", minor increases in TDS (<100 mg/L) may occur in some areas of southeastern Honey Lake Valley and in the Astor Pass area; these quality impacts could occur at some of the springs and flowing wells discussed in this section.

Surface Water Impacts for Fish Springs Ranch Project

The proposed water transmission pipeline would extend for 38 miles from Fish Springs Ranch wells to a storage tank on a divide between Antelope Valley and Lemmon Valley. Approximately 13 miles of this corridor would be shared with the proposed Intermountain Water Supply pipeline (2 miles in Dry Valley, 6 miles in Bedell Flat, and 5 miles in Antelope Valley). Therefore, approximately 25 miles of the Fish Springs Ranch water transmission pipeline are unique to this Proposed Action.

For the entire 38-mile proposed Fish Springs Ranch water transmission line, approximately 16 miles would be located adjacent to the Tuscarora Gas Pipeline right-of-way. This 16-mile section extends from southeastern Honey Lake Valley through Dry Valley and Bedell Flat. Eight miles of the 16-mile corridor along the Tuscarora Gas Pipeline are shared with the Intermountain Water Supply pipeline corridor.

The proposed water transmission pipeline for Fish Springs Ranch would cross numerous drainage channels (**Figure 3-6**). The pipeline would be buried to depths of about 4 to 6 feet below ground surface, except at some of the larger stream channel crossings where burial depth would increase to prevent potential scour effects. These larger stream channel crossings likely would occur at Fish Springs Creek, Dry Valley Creek, North Fork Dry Valley Creek, and South Fork Dry Valley Creek. Most of the remaining drainages are small ephemeral channels that contain flow only during brief periods of sufficient rainfall and/or snowmelt.

Pipeline construction across some stream channels may occur when there is flow in the channels, which would require mitigation measures to prevent adverse impacts from erosion and sedimentation (see

"*Monitoring and Mitigation Measures*" section). Time required to construct the pipeline across each stream channel would be short, followed by immediate reclamation to restore the channel to near pre-disturbance conditions. Based on USGS topographic maps, the following list indicates the number of stream channels that would be crossed by the proposed water transmission pipeline for Fish Springs Ranch (**Figure 3-6**):

- *Honey Lake Valley – Fish Springs Ranch Pipeline (12 miles)*: 19 ephemeral channels + Fish Springs Creek + Anderson Canyon Creek + Rock Springs Canyon Creek; most of these locations are near where channels from the Virginia Mountains meet the edge of Honey Lake Valley floor.

- *Dry Valley – Fish Springs Ranch Pipeline (9 miles)*: 12 ephemeral channels + North Fork Dry Valley Creek + Dry Valley Creek + South Fork Dry Valley Creek; most of these locations are near the valley floor where only portions of the major creeks have perennial flow. Approximately 2 miles of this pipeline segment are shared with Intermountain Water Supply's proposed pipeline corridor (6 ephemeral channels + South Fork Dry Valley Creek).

- *Bedell Flat – Fish Springs Ranch Pipeline (10 miles)*: 14 ephemeral channels; most locations are near the valley floor where perennial flow does not occur. Approximately 6 miles of this pipeline segment are shared with Intermountain Water Supply's proposed pipeline corridor (13 channels).

- *Antelope Valley – Fish Springs Ranch Pipeline (7 miles)*: no substantial drainage channel crossings.

No impacts to surface water quality are expected from the proposed Fish Springs Ranch Project, except for the possible impacts described previously under "*Impacts Common to Proposed Actions*" (e.g., accidental releases of hydraulic fluid, fuel, or oil).

Impacts to Water Users for Fish Springs Ranch Project

The primary potential impact to water users would be increased depth to groundwater within the zone of influence which could increase pumping lift costs. As shown on **Figures C-3, C-4** and **C-5** (**Appendix C**), the area of groundwater drawdown as predicted by the model for proposed Fish Spring Ranch pumping would expand over time (about 100 years) and reach a maximum drawdown of over 30 feet near the production wells at Fish Springs Ranch for a total pumping rate of 8,000 af/yr. The primary water use in the Ranch area is for irrigation; these irrigation wells would be replaced with the proposed production wells. Other areas of existing wells that could be affected by up to 15 feet of groundwater drawdown are: (a) Sand Pass area including the portion of Smoke Creek Desert immediately north of the pass; (b) Astor Pass Area including the portion of Pyramid Lake Valley immediately east of the pass; and (c) Dry Valley area in the northeast part of Honey Lake Valley. As described previously under "*Groundwater Impacts*", minor increases in TDS (<100 mg/L) may occur in some areas of southeastern Honey Lake Valley and in the Astor Pass area.

Impacts Unique to Intermountain Water Supply Project

Groundwater would be pumped at 2,000 af/yr from five wells in west-central Dry Valley, and 500 af/yr from two wells in the northwest part of Bedell Flat (**Figure 3-1**). Intermountain Water Supply has secured groundwater rights from the Nevada State Engineer for up to 3,000 af/yr from Dry Valley, including an inter-basin transfer of that amount. The Nevada State Engineer approved a water right of 144 af/yr for Intermountain Water Supply in Bedell Flat (Ruling 5429). An appeal to this ruling and a new application for 356 af/yr, both submitted by Intermountain Water Supply, are currently under consideration by the Nevada State Engineer.

Groundwater Impacts for Dry Valley

Groundwater Quantity

A MODFLOW® model was completed in 2005 by InterFlow Hydrology (2005a, 2005b) to simulate pumping groundwater from five wells at a combined rate of 2,000 af/yr. The production wells would be located in west-central Dry Valley near existing monitoring wells DVM-1 through DVM-5 (**Figure 3-5**). The model domain encompasses an area of about 17.5 square miles in the lower (western) valley floor of Nevada (**Figure 4-2**).

The model contains four layers: Layer 1 is the upper layer of the model, including ground surface, representing about 250 feet of Quaternary-age alluvium; Layer 2 represents a finer-grained portion of basin-fill deposits; Layer 3 represents the deeper coarser-grained basin-fill sediments; and Layer 4 represents deeper fractured volcanic tuff and granitic bedrock. Layer 1 groundwater is unconfined, Layers 3 and 4 are confined, and Layer 2 is convertible unconfined/confined. Hydraulic conductivity values used in the model are 4.0, 0.25, 1.0 and 1.0 ft/day for Layers 1 through 4, respectively. Total saturated thickness of the four layers that would be subject to groundwater extraction for the Proposed Action is a maximum of about 14,00 feet at the state-line.

The model was calibrated to steady-state conditions to simulate historic water levels at 10 wells in Dry Valley. Results of this model were used to represent baseline groundwater elevations in the basin. Subsequently, the model was amended to simulate pumping from five wells located in west-central Dry Valley at a combined rate of 2,000 af/yr (Proposed Action).

Hydrologic budgets resulting from the calibrated baseline model and pumping simulations are presented in **Table 4-4**. For baseline conditions, the model incorporates 1,362 af/yr of groundwater recharge: 621 af/yr to Layer 1 from precipitation in the mountains; 117 af/yr from streambed infiltration; and 623 af/yr to Layers 3 and 4 from groundwater inflow. Discharge from the baseline model area includes evapotranspiration at a rate of 517 af/yr, with an assumed extinction depth of 30 feet based on existing phreatophytes. Groundwater outflow westward across the state line to Long Valley, California is simulated at 531 af/yr, and discharge to lower Dry Valley Creek is 314 af/yr.

According to the California Department of Water Resources (2004), perennial yield for Long Valley is estimated at about 1,300 af/yr, with current groundwater withdrawals totaling about 100 af/yr (70 af/yr for agriculture and 30 af/yr for municipal/industrial uses). Long Valley Creek, most of which flows in California along the state line and ultimately into Honey Lake Valley, has an average annual flow of about 8,000 af/yr in the southern part of the watershed (Rockwell 1990). It is not known how much surface water in Long Valley Creek enters Honey Lake Valley farther to the north. Lassen County (2004) estimated the amount of groundwater that flows in Long Creek Valley alluvium in the narrow part of the valley near where it enters Honey Lake Valley using a seismic refraction study. Results of this study indicate groundwater flow is only about 150 af/yr (Lassen County 2004). This location is also near where Dry Valley joins Long Creek Valley.

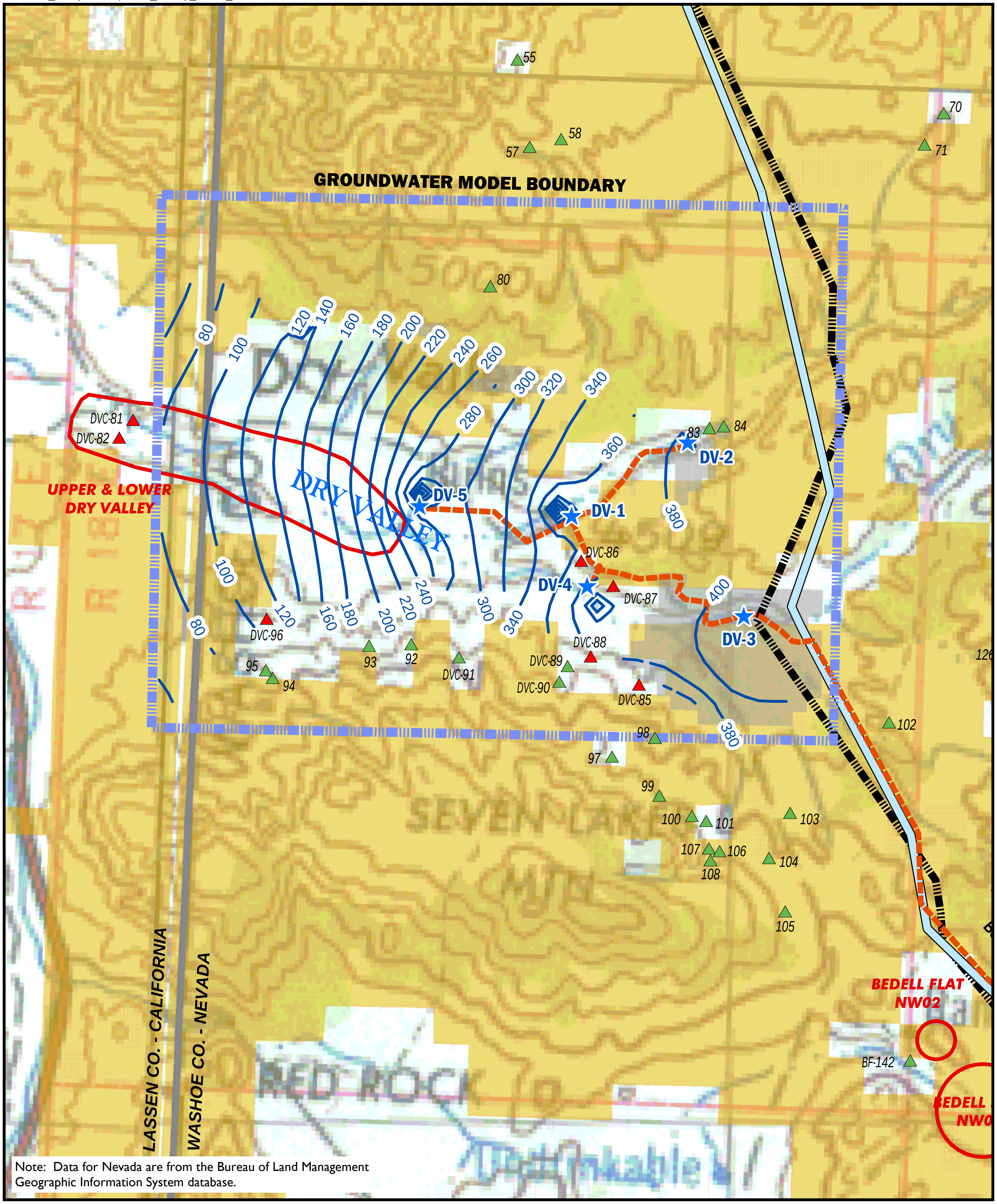
Two production wells completed by the Herlong Utilities Cooperative (HUC) southwest of the Sierra Army Depot are in lower Long Valley. These wells produce sufficient water such that up to 3,000 af/yr would eventually be supplied (Herlong Utilities Cooperative 2003). This indicates that the aquifer in lower Long Valley is considerably more productive than farther upstream above the Dry Valley confluence. Because of this condition, it is not likely that pumping wells in Dry Valley would affect groundwater levels in the vicinity of the HUC production wells and the Sierra Army Depot.

The groundwater model was used to simulate pumping from five wells in west-central Dry Valley at a combined rate of 2,000 af/yr (Proposed Action). Comparing the baseline and pumping condition water budgets in **Table 4-4** indicates that pumping 2,000 af/yr is predicted to eventually completely eliminate evapotranspiration (517 af/yr) and groundwater outflow to Long Valley (531 af/yr) in the model area. In addition, a groundwater flux from Long Valley back into Dry Valley is induced at 334 af/yr by year 100, and 712 af/yr eventually for steady-state conditions. As previously described, however, there may not be sufficient groundwater in Long Valley to eventually supply about 700 af/yr to Dry Valley for the proposed pumping of 2,000 af/yr (i.e., Lassen County estimated about 150 af/yr groundwater flow in Long Valley Creek alluvium just upstream of Dry Valley area).

It is possible that pumping from Dry Valley at 2,000 af/yr could eventually reduce any groundwater outflow occurring from upper Dry Valley to Warm Springs Valley (including Winnemucca Valley) via the Walker Lane fault zone. This area is outside of the model domain; however, the groundwater drawdown zone of influence could eventually extend into upper Dry Valley. InterFlow Hydrology (2005a) and the USGS (Berger *et al.* 2004) believe that hypothetical groundwater outflow along the Walker Lane fault zone northwest to Honey Lake Valley is not supported by the occurrence of springs along the fault zone. Deep geothermal groundwater inflow to Dry Valley is simulated in the model for baseline and pumping conditions.

According to the USGS (Lopes and Evetts 2004), natural groundwater recharge in Warm Springs Valley is 6,000 af/yr, and current groundwater pumping totals 5,000 af/yr (4,280 af/yr for irrigation/stock uses; 430 af/yr for domestic uses; 190 af/yr for water systems; and 100 af/yr for miscellaneous uses).

EIS\north_valley\arcmap\draft_eis\dry_bedell_drawdown.mxd



0 Miles 1

Proposed Pump Station
Proposed Pumping Wells
Proposed Pipeline Route
Proposed Pipeline Route
Tuscarora Natural Gas Pipeline
Contour of Predicted Maximum Drawdown (feet) In Layer 3 After Pumping 2,000 acre-feet/yr

Spring or Seep >4600 ft. Elev.
Spring or Seep <4600 ft. Elev.

Public Ownership

Bureau of Land Management
Potential Habitat for Carson Wandering Skipper
Area of Complete Aquifer Dewatering In Layer 3

Maximum Groundwater Drawdown at Steady State Predicted in Dry Valley
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE 4-2

The model predicts that groundwater drawdown at the state-line due to pumping of 2,000 af/yr would be 60 to 70 feet after 100 years, and would eventually be 80 to 105 feet at steady-state conditions (**Figure 4-2**). Drawdown at the pumping wells eventually would be up to about 430 feet. Drawdown is calculated by subtracting groundwater surface elevations developed using the baseline model from elevations developed for pumping under the Proposed Action. According to InterFlow Hydrology (2005b), approximately 85 percent of reductions in water levels, subsurface outflow, and evapotranspiration in the pumping center are achieved after 100 years of pumping.

TABLE 4-4
Hydrologic Budget for Groundwater Flow Model at Dry Valley

Budget Components	Estimated Quantity (acre-feet per year)			
	Baseline Conditions	Proposed Action Conditions at 2,000 af/yr Pumping (10 years)	Proposed Action Conditions at 2,000 af/yr Pumping (100 years)	Proposed Action Conditions at 2,000 af/yr Pumping (steady-state)
RECHARGE				
Release from Storage	0	1,388	380	0
Groundwater Inflow from Layer 3 Fault Zone	494	494	494	494
Groundwater Inflow to Layer 4 from Upgradient	129	129	129	129
Recharge from Precipitation in Mountains	621	621	621	621
Recharge from Upper Valley Streambed	47	47	47	47
Recharge from Lower Valley Streambed	70	123	0	0
Groundwater Inflow across State Line	0	0	334	712
TOTAL RECHARGE	1,362	2,802	2,004	2,004
DISCHARGE				
Groundwater Taken Into Storage	0	1	1	0
Withdrawal from Production Wells	0	2,004	2,004	2,004
Groundwater Outflow to Stream	314	123	0	0
Evapotranspiration	517	227	0	0
Groundwater Outflow across State Line	531	461	0	0
TOTAL DISCHARGE	1,362	2,814	2,004	2,004

Source: InterFlow Hydrology 2005b. Groundwater model output files.

Figures C-6 and **C-7** (**Appendix C**) are hydrographs of groundwater drawdown versus time (0 to 100 years) developed using InterFlow Hydrology's (2005b) model for two wells near the state line: Well No. 16 (USGS) and Well No. 17 (Lenz domestic well) (see **Figure 3-5** for well locations). Both wells show predicted drawdown of 2 to 7 feet at year 10, and about 60 to 70 feet at year 100. **Figures C-8, C-9,** and **C-10** (**Appendix C**) show distribution of groundwater drawdown in Layer 3 throughout western Dry Valley in plan view for 1, 10, and 100 years, respectively, after initiation of pumping 2,000 af/yr.

Groundwater Quality

Potential groundwater quality impacts are associated primarily with changes in salinity or TDS resulting from groundwater movement induced by the pumping wells. Water produced from test well DV-TW-1 is slightly geothermal and meets drinking water standards, based on two samples. TDS equals 210 mg/l. No playas are located in Dry Valley and no available data indicate areas of saline or high TDS groundwater are present in the vicinity of this basin. Proposed pumping at 2,000 af/yr would eventually draw groundwater from Long Valley into Dry Valley. No groundwater quality problems are known for this part of the Long Valley area. As a result, there is little potential for adverse impacts to groundwater quality resulting from proposed pumping in Dry Valley.

Impacts to Springs in Dry Valley

Table 4-5 describes springs that could be impacted by proposed pumping in west-central Dry Valley. These features are shown on **Figure 4-2**, along with the model prediction of groundwater drawdown contours. Springs located within the groundwater zone of influence as predicted in the model domain, and below an elevation of 4500 feet amsl are considered for this impact analysis because the regional water table in western Dry Valley has an uppermost elevation of about 4450 feet amsl (i.e., used for Layers 1 and 2 in model). Two springs (DVC-81 and DVC-82) are located below 4500 feet amsl in western Dry Valley; these two springs form a pond and wet area that are located on the western side of the state-line in California (**Figure 4-2**).

Table 4-5 also includes two springs (DVC-86 and DVC-87) located between 4500 and 4600 feet amsl that are farther upstream along the Dry Valley floor (**Figure 4-2**). Both springs have small discharges (<2 gal/min), with DVC-87 having no flow during the July 2004 site visit. Springs located above elevations of 4500 to 4600 feet amsl are assumed to be associated with localized groundwater systems in the mountains that are not connected to the regional valley flow system.

Potential impacts to springs include reduced or eliminated flow, changes in water quality, and reduced riparian vegetation if present. The magnitude of impact to a spring, if any, would depend on: (1) whether the source of water would be connected to the aquifer supplying water to the production wells; (2) magnitude of drawdown in relation to the hydraulic head at the spring or well; and (3) location of poorer quality groundwater in proximity to the spring.

TABLE 4-5 Springs That Could Be Affected by Groundwater Drawdown From Proposed Action Pumping at Dry Valley				
Spring Name/Number	Location	Elevation (feet)	Water Source	Site Description
Spring Present, Along with Riparian/Wetland Zone				
Spring in Dry Valley at Ground Surface Elevation 4500 feet				
DVC-81	SW,NE¼ Sec. 07, T24N, R18E. Located on private land.	4400	Seepage from channel alluvium into pond; no flow out of pond.	Pond along Dry Valley Creek channel bottom; herbaceous wetland habitat 0.2 acre (Westech 2004a); this site is within potential TES butterfly habitat (Sanford 2004a).
DVC-82	SW,NE¼ Sec. 07, T24N, R18E. Located on private land.	4410	Re-emergence of water in channel from upstream water at DVC-81.	Wet area along Dry Valley Creek channel bottom; herbaceous wetland habitat 0.3 acre (Westech 2004a); this site is within potential TES butterfly habitat (Sanford 2004a).
Spring in Dry Valley at Elevation Between 4500 and 4600 feet				
DVC-86 Duckweed Spring	NW,NE¼ Sec. 15, T24N, R18E. Located on private land.	4530	Small spring flowing 1-2 gpm.	Small dug-out spring at base of hillslope near Dry Valley Creek channel; herbaceous wetland habitat 0.1 acre (Westech 2004a).
DVC-87	SE,NE¼ Sec. 15, T24N, R18E. Located on private land.	4590	Small spring site; no flow during field observation in July 2004.	Small spring site along Dry Valley Creek channel bottom; herbaceous wetland habitat 0.1 acre (Westech 2004a).

Note:

1. Groundwater drawdown contours obtained from groundwater flow model performed by InterFlow Hydrology 2005.
2. Locations of springs obtained from Westech (2004a) and JBR Consultants Group (1990a, 1990b).
3. No threatened/endangered species (TES) butterfly habitat occurs in these spring areas according to Sanford (2004a, 2004b); the "Upper and Lower Dry Valley" areas of Carson wandering skipper habitat generally are saltgrass-greasewood communities that do not include any springs.
4. This table only lists springs located at elevations below 4,600 feet elevation along the Dry Valley floor, above which the springs are assumed to be from local perched groundwater flow systems in mountains that would not be affected by proposed pumping in west-central Dry Valley.
5. See **Figure 4-2** for locations of springs.
6. Sec. = Section; T = Township; R = Range; gpm = gallons per minute.

The groundwater surface elevation of about 4500 feet amsl is the most likely elevation that separates the regional groundwater flow system described in Layers 1, 2, 3, and 4 for the model (i.e., basin fill deposits, alluvium, and deep bedrock) from the localized groundwater flow system in bedrock comprising the surrounding mountains. Other springs located between 4500 and 4600 feet amsl in the model area (DVC-85, DVC-88, and DVC-96; **Figure 4-2**) are located along the southern mountain-slope base of Dry Valley. These three springs likely are part of the local groundwater flow system that is recharged and flows in bedrock as part of the Seven Lakes Mountains area and, therefore, would not be affected by proposed pumping in Dry Valley.

Total riparian or wetland habitat area in Dry Valley is about 4 acres, with approximately 1 acre of such habitat associated with the four springs listed in **Table 4-5** (Westech 2004a). Vegetation in these areas could be reduced if flow from the springs is diminished. Depth to groundwater in some Dry Valley wells is <10 feet below ground surface (**Table 3-3**); therefore, lowering this water table could adversely affect wetland habitat where plant roots extend up to 10 feet. It is expected that less than half of the riparian or wetland habitat areas included in **Table 4-5** would experience adverse effects from groundwater pumping because of the distance from pumping wells to the springs/flowing wells, and/or the lack of connection to the regional groundwater system.

No known springs exist in the vicinity of where Dry Valley meets Long Valley in California. It is likely that in this area, surface water in Long Valley Creek infiltrates into alluvium where the valley widens. There are springs in northwestern Winnemucca Valley near where it meets Dry Valley. If groundwater drawdown from Dry Valley eventually extends into Winnemucca Valley, flow from some of these springs could be reduced if connected to the regional valley bottom aquifer.

As previously described, lowering of groundwater levels caused by the proposed production wells would occur gradually over a period of 100 years or more. As described previously under "*Groundwater Impacts for Dry Valley*", no adverse impacts to groundwater quality, including springs, are expected due to proposed pumping in Dry Valley.

Impacts to Water Users in Dry Valley

The primary potential impact to water users would be increased depth to groundwater within the zone of influence which could require drilling deeper wells and increased pumping lift costs. In Dry Valley, only one well (Lenz well; **Figure 4-2**) is currently used for domestic and irrigation purposes (Stantec Consulting and Cordilleran Hydrology 2000). This well is located near the center of the valley at the state-line and is 100 feet deep. A Nevada water right for about 25 af/yr has been issued for this point of diversion. Model predictions show that the water level in the Lenz well would decline about 3 feet after 10 years, and about 70 feet after 100 years of pumping from western Dry Valley at 2,000 af/yr (**Figure C-7** in **Appendix C**).

A few wells domestic and/or irrigation wells reportedly are located near where Dry Valley joins Long Valley in California. This area could experience some reductions in groundwater levels due to pumping in western Dry Valley. As described previously under "*Groundwater Impacts for Dry Valley*", no adverse effects to groundwater quality are expected from proposed pumping in western Dry Valley.

Groundwater Impacts for Bedell Flat

Groundwater Quantity

A MODFLOW® model was completed in 2004 by InterFlow Hydrology (2004a) to simulate pumping groundwater from one well (BF-2) at a rate of 500 af/yr. The model boundary encompasses most of the Bedell Flat hydrographic area, including the mountain blocks surrounding the valley floor (**Figure 4-3**).

The upper layer (Layer 1) of the model represents the active groundwater flow system comprised primarily of unconsolidated basin fill deposits. Layer 1 also includes fractured volcanic bedrock in the southern part of the model domain and at four locations of subsurface outflow from the basin. The top of Layer 1 represents ground surface, and the bottom of Layer 1 is the surface of low permeable granite bedrock (Layer 2), which is a no-flow boundary. Layer 1 is assigned aquifer properties ranging from confined to unconfined conditions. Hydraulic conductivities for Layer 1 were distributed and refined during model calibration and range from 0.03 to 5.3 ft/day (InterFlow Hydrology 2004a).

Results of the groundwater flow model were used to represent baseline groundwater elevations in the basin as measured at selected existing wells. Subsequently, the model was amended to simulate pumping well BF-2 located in the northwest side of Bedell Flat at a rate of 500 af/yr. Even though the Proposed Action specifies the use of two production wells in Bedell Flat (BF-1 and BF-2), the model simulation is reasonable using one pumping well because the wells would be located in close proximity to each other (**Figure 4-3**).

Hydrologic budgets used in the baseline model and pumping simulation are presented in **Table 4-6**. For baseline conditions, the model assumes approximately 1,300 af/yr of total groundwater recharge from precipitation based on results of the Maxey-Eakin and chloride-balance estimating techniques previously applied to Bedell Flat (Rush and Glancy 1967; InterFlow Hydrology and Cordilleran Hydrology 2003). Recharge is distributed to the model at the valley floor margins adjacent to the three major mountain blocks that bound the watershed: Dogskin Mountain along the north edge of the basin adds 75 percent of total recharge, Freds Mountain along the south edge adds 14 percent, and Sand Hills along the west edge adds 11 percent of total recharge. Additional recharge would occur from groundwater released from storage after initiation of pumping (446 af/yr by year 10, and 174 af/yr at 100 years).

For the baseline model, groundwater is discharged as evapotranspiration and subsurface outflow. Subsurface outflow through unconsolidated fill and fractured bedrock occurs from the northwest side of the basin to Red Rock Valley located at the northwest margin of Bedell Flat near the boundary with Red Rock Valley (**Figure 4-3**). According to the USGS (Lopes and Evetts 2004), 900 af/yr of natural groundwater occurs as recharge in Red Rock Valley, and current groundwater pumping from this basin totals about 70 af/yr, all for domestic purposes. For baseline conditions, the groundwater model incorporates groundwater flow of 450 af/yr from Bedell Flat into Red Rock Valley.

Subsurface outflow through fractured bedrock is modeled from the east side of the basin to Warm Springs Valley and Antelope Valley, although modeled flow to Antelope Valley is negligible. The USGS (Lopes and Evetts 2004) report 6,000 af/yr of natural recharge to groundwater in Warm Springs Valley, and current groundwater withdrawal totals 5,000 af/yr (4,280 af/yr for irrigation and stock uses; 430 af/yr for domestic purposes; 190 af/yr for water systems; and 100 af/yr for miscellaneous uses). For baseline conditions, the groundwater model incorporates groundwater flow of 782 af/yr from Bedell Flat into Warm Springs Valley.

To simulate groundwater conditions that would develop under the Proposed Action, pumping of well BF-2 in the northwest side of Bedell Flat at a rate of 500 af/yr is used as a groundwater discharge component, in addition to evapotranspiration and subsurface outflow. Water budgets show that total recharge and discharge rates are similar between the baseline condition and ultimate steady-state conditions for the Proposed Action, with recharge/discharge increasing during the first 100 years of pumping due to release of groundwater from storage (**Table 4-6**).

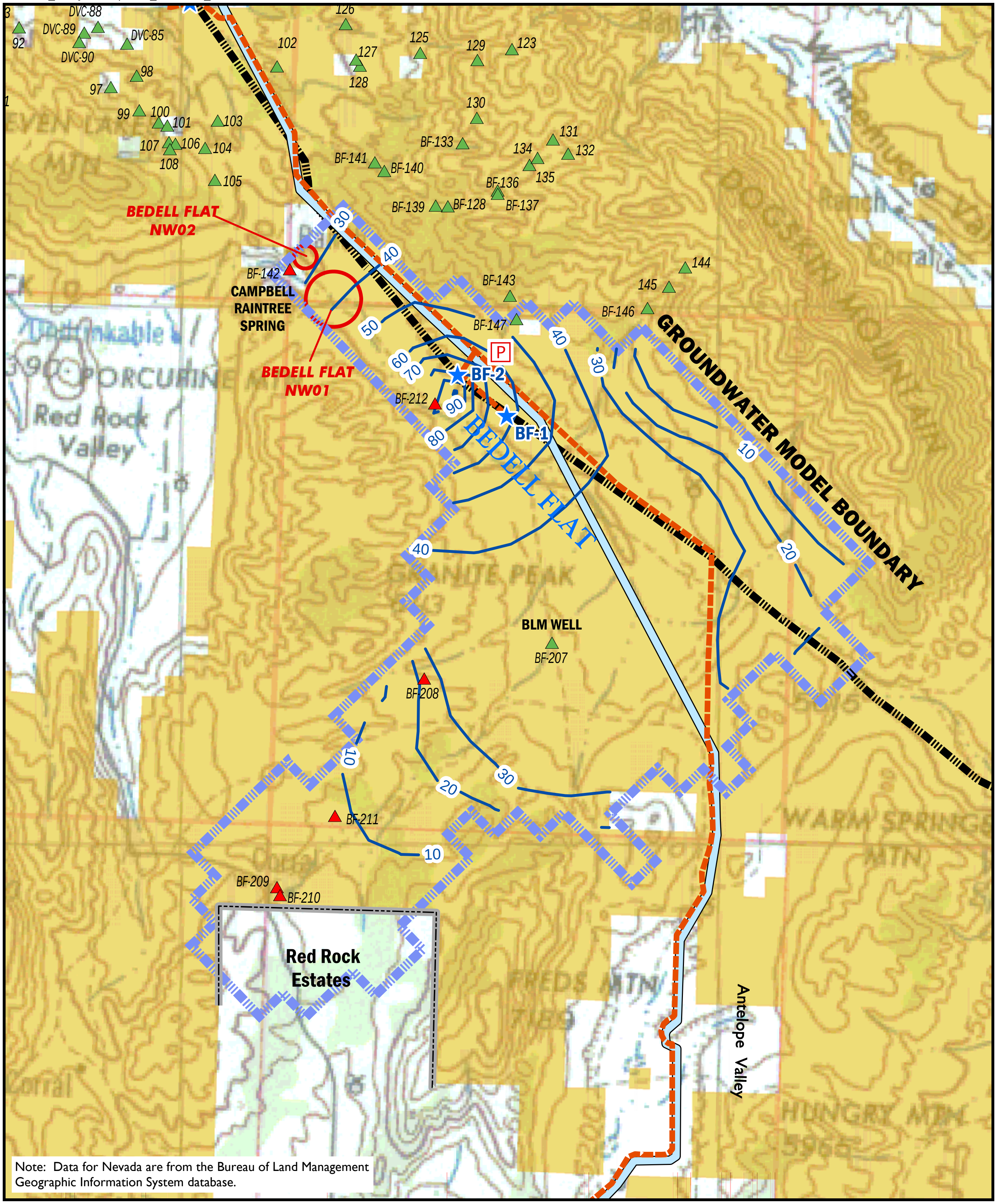
TABLE 4-6
Hydrologic Budget for Groundwater Flow Model at Bedell Flat

Budget Components	Estimated Quantity (acre-feet per year)			
	Baseline Conditions	Proposed Action Conditions at 500 af/yr Pumping (10 years)	Proposed Action Conditions at 500 af/yr Pumping (100 years)	Proposed Action Conditions at 500 af/yr Pumping (steady-state)
RECHARGE				
Release from Storage	0	446	174	0
Recharge from Precipitation	1,306	1,306	1,306	1,306
Groundwater Inflow	0	0	0	0
TOTAL RECHARGE	1,306	1,752	1,480	1,306
DISCHARGE				
Groundwater Evapotranspiration	73	66	38	29
Groundwater Outflow to Red Rock Valley	450	402	211	155
Groundwater Outflow to Warm Springs Valley	782	782	729	621
Withdrawal from Wells	0	501	501	501
TOTAL DISCHARGE	1,305	1,751	1,479	1,306

Source: InterFlow Hydrology 2004a. Groundwater model output files.

All evapotranspiration in the model occurs in a wetland area surrounding Campbell Spring located at the northwest margin of Bedell Flat at the boundary with Red Rock Valley (**Figure 4-3**). Discharge from the spring is included in the evapotranspiration budget in **Table 4-6**. The evapotranspiration rate and extinction depth (50 feet) used in the model produce 73 af/yr of discharge at the Campbell Spring area

EIS\north_valley\arcmap\draft_eis\bedell_drawdown.mxd



0 Miles 2

P Proposed Pump Station
Proposed Pipeline Route
Proposed Pipeline Route
Tuscarora Natural Gas Pipeline
Proposed Pumping Wells
Contour of Predicted Maximum Drawdown (feet) In Layer 1 After Pumping 500 acre-feet/yr

Spring or Seep > Valley Fill Aquifer
Spring or Seep < Valley FIll Aquifer
Public Ownership
Bureau of Land Management
Potential Habitat for Carson Wandering Skipper

Maximum Groundwater Drawdown
at Steady State
Predicted in Bedell Flat
North Valleys Rights-of-Way
Projects EIS
Washoe County, Nevada
FIGURE 4-3

for baseline conditions. This evapotranspiration rate declines to 66 af/yr in year 10, 38 af/yr in year 100, and 29 af/yr for steady-state conditions.

Total discharge from the basin is assumed to equal recharge. As a result, under baseline conditions, combined total discharge via groundwater outflow is the remainder of available recharge, or 1,232 af/yr (450 af/yr to Red Rock Valley and 782 af/yr to Warm Springs Valley; **Table 4-6**). For final steady-state conditions, total subsurface outflow through the model area is predicted to decrease by 456 af/yr (from 1,232 to 776 af/yr; **Table 4-6**) due to the proposed pumping of 500 af/yr in Bedell Flat. Of this amount, about 300 af/yr of groundwater flow reduction would occur to Red Rock Valley. This is about 67 percent of estimated natural groundwater flow from Bedell Flat to Red Rock Valley, and about 33 percent of natural groundwater recharge to Red Rock Valley estimated by the USGS. The predicted amount of groundwater flow reduction to Warm Springs Valley of about 160 af/yr resulting from proposed pumping in Bedell Flat is about 20 percent of estimated natural groundwater flow to Warm Springs Valley from Bedell Flat, and about 3 percent of natural groundwater recharge to Warm Springs Valley.

For the proposed pumping of 500 af/yr in Bedell Flat, predicted maximum steady-state groundwater drawdown would be 116 feet in the vicinity of pumping well BF-2, 28 feet at Campbell Spring, 35 feet at the BLM stockwater well located near the valley center, 32 feet at a domestic well at the east margin of the basin, and 9 feet at domestic wells along the southern margin of the basin (**Figure 4-3**). Drawdown is calculated by subtracting groundwater surface elevations developed using the baseline model from elevations developed for pumping under the Proposed Action. According to InterFlow Hydrology (2004a), 65 percent of reductions in water levels, subsurface outflow, and evapotranspiration are achieved after 100 years of pumping.

Figures C-11 and **C-12** (**Appendix C**) present hydrographs of groundwater drawdown versus time (0 to 100 years) developed using InterFlow Hydrology's 2004 model for two wells in Bedell Flat -- BLM stockwater well and Etcheverry domestic well No. 16 (see **Figure 3-5** for well locations). The BLM stockwater well shows drawdown of about 0.2 feet in year 1, and 11.7 feet in year 100. Predicted drawdown of 0.01 foot or less occurs at the domestic wells in southern Bedell Flat at both 1 and 100 years. **Figures C-13, C-14** and **C-15** (**Appendix C**) show the distribution of groundwater drawdown in Layer 1 throughout Bedell Flat in plan view for 1, 10, and 100 years, respectively, after initiation of pumping 500 af/yr.

Groundwater Quality

Potential groundwater quality impacts are associated primarily with changes in salinity or TDS resulting from groundwater movement induced by the pumping wells. Quality of water from wells BF-1 and BF-2 in Bedell Flat is good with TDS concentrations less than 150 mg/L, sulfate of about 20 mg/L, and low levels of ions and metals. Groundwater quality also is relatively good from domestic wells in the southern part of the valley, with TDS in the range of 170 to 320 mg/L. All of these samples meet drinking water standards. No playas are located in Bedell Flat and no available data indicate areas of saline or high TDS groundwater are present in the vicinity of this basin. As a result, there is little or no potential for adverse impacts to groundwater quality resulting from proposed pumping in Bedell Flat.

Impacts to Springs in Bedell Flat

Table 4-7 lists springs that potentially could be impacted by proposed pumping in Bedell Flat. These features are shown on **Figure 4-3**, along with the model prediction of groundwater drawdown contours. For the southern portion of Bedell Flat, springs located within the groundwater zone of influence as predicted in the model domain, and below an elevation of 5700 feet amsl are considered for this impact analysis because the regional water table in southern Bedell Flat has an uppermost elevation of about 5680 feet amsl (i.e., used for Layer 1 in model) (InterFlow Hydrology 2004b).

For the northern portion of Bedell Flat, springs located below an elevation of 5100 feet amsl are considered for this impact analysis because the regional water table in this area is <5100 feet amsl (InterFlow Hydrology 2004b). Springs located above an elevation of 5700 feet in the southern part and 5100 feet in the northern part of Bedell Flat are assumed to be associated with localized groundwater systems in the mountains not connected to the regional valley flow system.

Potential impacts to springs include reduced or eliminated flow, changes in water quality, and reduced riparian vegetation if present. The magnitude of impact to a spring, if any, would depend on: (1) whether the source of water would be connected to the aquifer supplying water to the production wells; (2) magnitude of drawdown in relation to the hydraulic head at the spring or well; and (3) location of poorer quality groundwater in proximity to the spring.

Four springs are present in southern Bedell Flat below an elevation of 5700 feet amsl, and two springs are in the northern part of Bedell Flat below an elevation of 5100 feet amsl (**Table 4-7** and **Figure 4-3**). These are the most likely elevations that separate the regional groundwater flow system described in Layer 1 for the model (i.e., basin fill deposits) from localized groundwater flow systems in bedrock comprising the surrounding mountains. Total riparian or wetland habitat associated with these six springs is about 5 acres (**Table 4-7**). Less than half of these areas would experience any adverse effects from groundwater pumping because of the distance from pumping wells to the springs/flowing wells, and/or the lack of connection to the regional groundwater system.

Three of the four springs (BF-209, BF-210, and BF-211) in southern Bedell Flat listed in **Table 4-7** are named springs with low flow and small riparian/wetland areas. The other spring site in southern Bedell Flat (BF-208) that could be affected by proposed pumping was identified by the watering troughs and ponds, but the actual water source could not be located in the field.

TABLE 4-7
Springs That Could Be Affected by Groundwater Drawdown From Proposed Action Pumping at Bedell Flat

Spring or Well Name/Number	Location	Elevation (feet)	Water Source	Site Description
Spring Present, Along with Riparian/Wetland Zone				
Spring in Northern Bedell Flat Below Ground Surface Elevation of 5100 feet				
BF-142 Campbell Spring or Raintree Spring	NW,SW¼ Sec. 31, T24N, R19E. Located on private land.	4820	Spring/seep flowing 5-10 gpm from base of hillside.	Located at Campbell Ranch; extensive wetland area habitat 3.4 acres (Westech 2004a); this area is potential TES butterfly habitat according to Sanford (2004a).
BF-212 Watering Troughs & Pond	SW,SW¼ Sec. 14, T23N, R19E. Located on public land.	4890	Unknown; source may be distant well or spring that is connected by underground pipe to troughs; flowing 1-2 gpm.	Pipe from a distant well or spring discharges to 3 steel watering troughs and a pond in valley bottom; <0.1 acre wetland habitat at pond (Westech 2004a).
Spring in Southern Bedell Flat Below Ground Surface Elevation of 5700 feet				
BF-208 Watering Troughs & Ponds	SE,NE¼ Sec. 29, T23N, R19E. Located on public land.	5380	Unknown; source may be distant well or spring that is connected by underground pipe to troughs and ponds; flowing 5 gpm.	Pipe from distant well or spring discharges to 2 watering troughs and 2 ponds; herbaceous wetland <0.1 acre (Westech 2004a).
BF-209 Bird Spring	NW,SW¼ Sec. 6, T22N, R19E. Located on public land.	5690	Small spring site; only standing water observed during field observation in July 2004.	Small spring site along drainage swale; herbaceous wetland habitat 0.6 acre (Westech 2004a).
BF-210 Juniper Spring	NE,SW¼ Sec. 6, T22N, R19E. Located on public land.	5590	Underground pipe from spring discharging <1 gpm to watering trough; no flow observed at spring site.	Small spring site along drainage swale; herbaceous wetland habitat <0.1 acre (Westech 2004a).
BF-211 Whitney Spring	SE,SE¼ Sec. 31, T23N, R19E. Located on public land.	5450	Underground pipe from spring discharging <1 gpm to watering trough.	Small spring site along drainage swale; herbaceous wetland habitat 0.4 acre (Westech 2004a).

Note:

1. Groundwater drawdown contours obtained from groundwater flow model performed by InterFlow Hydrology 2004b.
2. Locations of springs obtained from Westech (2004a) and JBR Consultants Group (1990a, 1990b); threatened/endangered species (TES) butterfly (i.e., Carson wandering skipper) habitat information from Sanford (2004a, 2004b).
3. This table only lists springs located at elevations below 5100 feet elevation in northern Bedell Flat and 5700 feet in southern Bedell Flat, above which the springs are assumed to be from local perched groundwater flow systems in mountains that would not be affected by proposed pumping in northwestern Bedell Flat.
4. See **Figure 4-3** for locations of springs.
5. Sec. = Section; T = Township; R = Range; gpm = gallons per minute.

One of the two springs listed in **Table 4-7** for northern Bedell Flat (BF-142; Campbell or Raintree Spring) is located in the Campbell Ranch area. This spring area has a wetland habitat of approximately 3 acres. The other spring (BF-212) identified in northern Bedell Flat that could be affected by proposed pumping was identified by watering troughs and a pond, but the actual water source could not be located in the field. The magnitude of impact to these springs in Bedell Flat, if any, would depend on the source's connection with the aquifer subject to production well pumping. The groundwater flow model predicts that the groundwater level at Campbell/Raintree Spring would eventually decline by about 20 feet due to pumping 500 af/yr at well BF-2 (InterFlow Hydrology 2004b).

Any springs in Warm Springs Valley and Red Rock Valley located near Bedell Flat could experience flow reductions if they are connected to the regional valley bottom aquifer. This would only occur if groundwater flow from Bedell Flat to these adjacent valleys is reduced.

As previously described, lowering of groundwater levels would occur gradually over a period of 100 years or more. As described under "*Groundwater Impacts for Bedell Flat*", no adverse impacts to groundwater quality, including springs, are expected due to proposed pumping in Bedell Flat.

Impacts to Water Users in Bedell Flat

The primary potential impact to water users would be increased depth to groundwater within the zone of influence which could require drilling deeper wells and increased pumping lift costs. In Bedell Flat, approximately 35 domestic wells and a few non-domestic wells have been completed in the southern part of the basin as part of the Red Rock Estates subdivision (**Figure 3-5**). These wells generally are completed in fractured bedrock (InterFlow Hydrology and Cordilleran Hydrology 2003). Model predictions show that water levels in these wells could eventually decline by about 9 feet over a period of 100 years or more (InterFlow Hydrology 2004b). These wells generally are over 200 feet deep with at least 100 feet of water column in the well (**Table 3-3**). The impact to these wells in southern Bedell Flat from lowered groundwater levels associated with proposed pumping in northwestern Bedell Flat, therefore, is considered minor.

Five additional domestic wells have been identified in the northwest part of Bedell Flat (**Figure 3-5**). These wells are located in the Sand Hills and have water level elevations of about 5500 feet amsl. Therefore, wells in this area likely intercept local groundwater systems associated with bedrock in the mountains that would not be affected by pumping in valley fill deposits of Bedell Flat.

The BLM stockwater well located in the central part of Bedell Flat (**Figure 3-5**) is predicted to have up to approximately 35 feet of drawdown due to proposed pumping in northwestern Bedell Flat. This well is 224 feet deep with a depth to water of about 180 feet (**Table 3-3**). This BLM well, therefore, may eventually need to be deepened due to the lowered groundwater level; however, this would likely not be required until 100 years or more after initiation of pumping proposed by Intermountain Water Supply.

Private domestic and/or irrigation wells located in Warm Springs Valley and Red Rock Valley near Bedell Flat could experience lowered groundwater levels from proposed pumping in Bedell Flat. This would occur only if the wells are completed in the regional valley bottom aquifer, and if there is a reduction in groundwater flow from Bedell Flat to these adjacent basins.

As described previously under "*Groundwater Impacts for Bedell Flat*", no adverse effects to groundwater quality are expected from proposed pumping in northwestern Bedell Flat.

Surface Water Impacts for Dry Valley and Bedell Flat

The proposed water transmission pipeline would extend for 24 miles from the Dry Valley wells to the Bedell Flat well, and then to the pipeline terminus in Lemmon Valley. Approximately 13 miles of this corridor would be shared with the proposed Fish Springs Ranch pipeline (2 miles in Dry Valley, 6 miles in Bedell Flat, and 5 miles in Antelope Valley). Therefore, approximately 11 miles of the Intermountain Water Supply water transmission pipeline are unique to this Proposed Action.

For the entire 24-mile proposed Intermountain Water Supply water transmission line, approximately 8 miles would be located adjacent to the Tuscarora Gas Pipeline right-of-way. This 8-mile section extends from central Dry Valley through northwestern Bedell Flat. This entire 8-mile corridor along the Tuscarora Gas Pipeline is shared with the Fish Springs Ranch pipeline corridor.

The proposed water transmission pipeline for Intermountain Water Supply would cross numerous drainage channels (**Figure 3-6**). The pipeline would be buried to depths of about 4 to 6 feet below ground surface, except at some of the larger stream channel crossings where burial depth would increase to prevent potential scour effects. These larger stream channel crossings likely would occur at Dry Valley Creek, North Fork Dry Valley Creek, and South Fork Dry Valley Creek. Most of the remaining drainages are small ephemeral channels that contain flow only during brief periods of sufficient rainfall and/or snowmelt.

Pipeline construction across some stream channels may occur when there is flow in the channels, which would require mitigation measures to prevent adverse impacts from erosion and sedimentation (see "*Monitoring and Mitigation Measures*" section). Time required to construct the pipeline across each stream channel would be short, followed by immediate reclamation to restore the channel to near pre-disturbance conditions. Based on USGS topographic maps, the following list indicates the number of stream channels that would be crossed by the proposed water transmission pipeline for Intermountain Water Supply (**Figure 3-6**):

- *Dry Valley – Intermountain Pipeline (5 miles)*: 12 ephemeral channels + North Fork Dry Valley Creek + Dry Valley Creek + South Fork Dry Valley Creek; most of these locations are near the valley floor where only portions of the major creeks have perennial flow. Approximately 2 miles of this pipeline segment are shared with Fish Spring Ranch's proposed pipeline corridor (6 ephemeral channels + South Fork Dry Valley Creek).

- *Bedell Flat – Intermountain Pipeline (11 miles)*: 14 ephemeral channels; most locations are near the valley floor where perennial flow does not occur. Approximately 6 miles of this pipeline segment are shared with Fish Spring Ranch's proposed pipeline corridor (13 ephemeral channels).

- *Antelope Valley – Intermountain Pipeline (5 miles)*: No substantial drainage channel crossings. Approximately 5 miles of this pipeline segment are shared with Fish Spring Ranch's proposed pipeline corridor.

- *Lemmon Valley – Intermountain Pipeline (3 miles)*: 8 ephemeral channels.

Groundwater drawdown in Dry Valley resulting from pumping 2,000 af/yr would extend into Long Valley of California. In the vicinity of where Dry Valley joins Long Valley, it is likely that Long Valley Creek loses flow naturally to underlying groundwater in alluvial deposits because the valley becomes wider and flatter in this area. In this case, pumping in Dry Valley would not likely affect flow in Long Valley Creek. If there is any perennial stream flow in Warms Springs Valley (including Winnemucca Valley) and Red Rock Valley in proximity to Dry Valley or Bedell Flat, decreasing stream flow could occur as a result of pumping in Dry Valley and Bedell Flat. This would occur only if there is a decrease in groundwater flow to these basins surrounding Dry Valley and Bedell Flat.

No impacts to surface water quality are expected from the proposed Intermountain Water Supply project, except for the possible impacts described previously under "*Impacts Common to Proposed Actions*" (e.g., accidental releases of hydraulic fluid, fuel, or oil).

ALTERNATIVE A – CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

Disturbed areas associated with water transmission pipeline crossing of drainage channels (i.e., non-wetland waters of the U.S.) would be reduced by approximately 28 acres for Alternative A. Potential impacts to groundwater resources from drawdown due to production well pumping would be similar to effects described for "*Impacts Common to Proposed Actions"*, "*Impacts Unique to Fish Springs Ranch Project*", and "*Impacts Unique to Intermountain Water Supply Project*".

NO ACTION ALTERNATIVE

No Action for Fish Springs Ranch Project

Under the No Action Alternative, Fish Springs Ranch could continue to pump groundwater using permits previously approved by the Nevada State Engineer. Such groundwater extraction could cause seasonal lowering of groundwater levels similar to those described previously for baseline conditions. Withdrawal of groundwater for irrigation occurs seasonally which allows for some groundwater recovery during periods of non-pumping. Groundwater extraction of about 4,200 af/yr for irrigation purposes from five wells at Fish Springs Ranch over the last 10 years may have contributed to elimination and reduction of flow from some springs and flowing wells (e.g., Fish Springs and Lime Rock/Desert Wells), and also may have eliminated or reduced some wetland areas.

Selection of the No Action Alternative for the Fish Springs Ranch Project could eliminate predicted impacts to water resources associated with this Proposed Action. However, to the extent that Fish Springs Ranch could proceed with groundwater extraction and distribution on private land under their water rights, some springs and/or flowing wells could be affected.

Construction-related impacts for the water transmission pipelines (i.e., short-term disturbance of drainage channels) would not occur under the No Action Alternative. All other water-related impacts described previously for the action alternatives would not occur under the No Action Alternative.

No Action for Intermountain Water Supply Project

Under the No Action Alternative, Intermountain Water Supply could pump groundwater for beneficial uses approved by the State Engineer, up to the amount of water provided in their existing water rights. Such groundwater extraction and distribution, however, would not occur on public land. No specific uses for water other than those described in the Proposed Action for Intermountain Water Supply have been identified.

Selection of the No Action Alternative for the Intermountain Water Supply project could eliminate projected impacts to water resources associated with this Proposed Action. To the extent that Intermountain Water Supply could proceed with groundwater withdrawal and distribution on private land under their water rights, some springs could be affected.

MONITORING AND MITIGATION MEASURES

Measures Common to Proposed Actions

Stream channel crossings would be constructed in accordance with State Stream Alteration Permits, U.S. Army Corps of Engineer requirements, and land management agencies. Crossings would be constructed during low-flow conditions, where possible, and as close to perpendicular to the axis of the channel as engineering and routing conditions permit. In some instances, banks of the channel may be excavated to allow equipment access to the channel bottom. Soil would be stockpiled approximately 10 feet from the top of channel banks, but within the right-of-way. Equipment operation in the stream channel would be limited to that needed to construct the crossing, and is not expected to require more than two days per crossing.

Where flowing water is encountered during construction, sediment barriers (such as silt fences) would be installed after initial disturbance of the stream channel or adjacent upland. Silt fences would be staggered downstream of the crossing on both banks to capture sediment discharged into the stream during trenching and backfill. Sediment barriers would be properly maintained throughout construction and reinstalled as necessary (such as after backfilling the trench) until restoration of the right-of-way has been completed. After the pipe is installed, stockpiled growth media would be used to restore banks of the channel to a stable configuration as close to preconstruction contours as possible.

The following measures would be implemented where the proposed water transmission pipeline crosses streams, wetlands, or riparian areas:

- Construction in streams and wetlands would be expedited to minimize the duration of turbidity-causing activities.
- Selecting an alignment that minimizes stream crossings.
- Scheduling construction of stream crossings during periods of low or no flow.
- Implementing temporary erosion and sediment control practices.
- Restoring stream banks and wetlands to original configuration as soon as possible.
- Stabilizing stream banks and adjacent areas with permanent erosion control and vegetation as soon as possible.
- Periodic inspection of the right-of-way during and after construction to identify and perform maintenance activities.

Chemicals, fuels, and lubricants would not be stored within 300 feet of a stream crossing. Gasoline, oil, and lubricants would be transported in approved containers in accordance with National Fire Protection Association Code. Sorbant material would be maintained on-site to absorb spills of petroleum products that may occur during construction activities.

Appendix D - *Recommended Water Resources Monitoring and Management Plan,* identifies possible monitoring and management measures that could be implemented to address potential impacts from groundwater pumping and lowered groundwater levels within and surrounding Honey Lake Valley (Fish Springs Ranch Project), and Dry Valley and Bedell Flat (Intermountain Water Supply Project).

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Common to Proposed Actions

Loss or reduction in flow from springs/wells and associated riparian and wetland areas would be for the duration of the Projects, but if groundwater pumping were stopped, flows from springs/wells and associated wetland habitat could eventually recover to approximate pre-project levels. This recovery period is unknown, but likely would be several years depending on the total period of pumping, extent of wetland habitat loss, and whether recovery occurs naturally or is assisted through a revegetation program.

RESIDUAL EFFECTS

Effects Common to Proposed Actions

Residual effects would remain where lowered groundwater levels and/or reduced flow from springs/wells caused by production well pumping would have a permanent effect on groundwater availability in the basins.

SOIL RESOURCES

SUMMARY

The Fish Springs Ranch Proposed Action would result in approximately 395 acres of surface disturbance from installation of about 38 miles of water transmission pipelines, wells, pump station, storage tanks, and an electrical substation. The Intermountain Water Supply Proposed Action would involve about 241 acres of surface disturbance from installation of 24 miles of water transmission pipelines, wells, pump station, and storage tanks.

Portions of the pipeline routes included in the Proposed Actions would occur adjacent to previously reclaimed land associated with the Tuscarora Natural Gas Pipeline. Potential impacts to soil resources include modification to chemical and physical characteristics. These impacts are expected to be minimized, to the extent possible, following reclamation. Loss of soil and short-term interruption of natural soil processes and functions would be reversed by natural soil development over time.

DIRECT AND INDIRECT IMPACTS

Proposed Actions

Impacts Common to Proposed Actions

Impacts on soil resources occur in two separate stages: during and after pipeline installation operations. Short-term impacts resulting from initial pipeline construction activities include increased soil compaction and destruction of soil structure. Additional potentially longer term impacts could result from mixing of surface and subsurface soil horizons and wind and water erosion. Although impacts to soil are greater during construction activities, topsoil erosion during and after topsoil redistribution has a greater potential effect on reclamation success.

Chemical changes would also result from mixing surface soil with subsoil during salvage activities. Mixing surface and subsurface soil types can effectively dilute organic matter and nutrient content of the surface soil. Mixing of surface and subsurface soil types can also result in increases in clay content, pH, and salt content of surface soil. Such impacts to the soil resource could result in reduced productivity and cause difficulty in revegetating some soil types.

Impacts on physical characteristics of soil during salvage, stockpiling, and redistribution would include compaction, and destruction of soil structure as a result of soil handling and surface traffic. These impacts could impede root growth and result in decreased infiltration rates and permeability. Decreased infiltration rates and permeability would result in increased surface runoff and potentially more erosion from impacted sites. If conducted to adequate depth and spacing, ripping would eliminate the majority of subsoil compaction.

Short-term surface soil loss by wind erosion associated with the Proposed Actions would be greater than normal until vegetation is reestablished. Potential for loss of subsoil would be greatest between initial disturbance and redistribution of cover soil. The volume of soil loss due to wind erosion depends on wind velocity, size of disturbance area, condition of exposed area, and soil texture. Water erosion potential is influenced by the extent of disturbance, surface soil texture, soil cover, and steepness of slope and could be significant during heavy precipitation events.

Due to the relatively short construction period and prompt replacement of salvaged soil, reduction in soil biological activity is expected to be short-term. After soil redistribution, biological activity would increase and eventually reach pre-salvage levels.

Greatest risks for long-term soil impacts include soil loss from wind and water erosion and decline in productivity as a result of mixing and compaction. This potential for soil loss occurs until vegetation is reestablished. Productivity levels may be reduced for several years where compaction is not mitigated or where topsoil is mixed with comparatively unsuitable (e.g., high clay content, saline, or high coarse fragment) subsoil types.

Service Area

Soil resources in the Service Area would be affected by development of housing, commercial buildings, and infrastructure that result from delivery of water to the Stead/Lemmon Valley Area. Most land disturbance associated with development activity in these areas would result from excavations for building foundations, roads, and community infrastructure. This would result in short-term surface soil loss by wind and water erosion during the construction period until vegetation is reestablished or the surface is covered with buildings, paved roads, and parking lots.

Impacts Unique to Fish Springs Ranch Project

Approximately 395 acres would be disturbed as a result of the proposed Fish Springs Ranch project. Soil types encountered at the north end of the Projects Area include those formed from lacustrine deposits on alkali flats of Honey Lake Valley. These soil types occur extensively in the Dedmount-Umberland Association along the proposed pipeline corridor and exhibit high alkalinity, shallow development, and relatively inhospitable plant growth characteristics relative to other soil types. This soil type could prove difficult to revegetate.

Impacts Unique to Intermountain Water Supply Project

Approximately 241 acres would be disturbed as a result of the proposed Intermountain Water Supply project. Soil salvage and replacement was proposed for the entire Project, although depths are unspecified. Soil should be salvaged at depths that ensure the most suitable growth material is removed and kept separate from less suitable underlying material. Depth of salvage should be variable to allow for greater salvage depths in deeper, more productive soil types, and less salvage in soil types with shallow bedrock or relatively unsuitable subsurface soil types.

ALTERNATIVE A – CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

Impacts resulting from implementation of Alternative A would be similar to those described for the Proposed Actions except that 28 fewer acres would be disturbed. Reduction in surface disturbance would reduce the amount of soil loss from erosion and handling and further limit other impacts to the soil resource. However, the types of impacts would be comparable to the Proposed Actions and no specific soil types would be avoided with this alternative.

NO ACTION ALTERNATIVE

Common to Proposed Actions

The No Action Alternative would eliminate potential impacts of the Proposed Actions on soil resources, unless other water development projects are initiated by the Proponents on private land as approved by the State Engineer.

MONITORING AND MITIGATION MEASURES

Measures Common to Proposed Actions

Soil in the area varies in ability to support revegetation. On some soil, vegetation is relatively easy to establish and maintain, the surface is stable and resists erosion, and reconstructed soil has good potential productivity. Other soil types can be vegetated and stabilized by modifying one or more properties. Top-dressing with better material or application of soil amendments may be necessary for satisfactory performance. Top-dressing with better material is often necessary to establish and maintain vegetation. Management practices, such as minimizing the time soil is exposed, mulching of steeper slopes, and appropriate silt fence placement would reduce losses.

Prior to reclamation, the Washoe County Soil Survey prepared by the Natural Resources Conservation Service (NRCS) should be referenced to determine the appropriate depth of growth media to salvage prior to trenching activities. Depth of the growth media should be maximized to assist in successful reclamation. This is required, in part, because of the generally low water holding capacity and limited soil fertility, combined with the arid environment. Where possible, topsoil salvage should be no less than 6 inches. In areas of saline clay subsoil, care should be taken to salvage only the upper organic horizon to avoid using the saline soil as a potential growth media.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Common to Proposed Actions

Soil loss as a result of natural or man-caused forces would be irreversible and irretrievable.

RESIDUAL EFFECTS

Effects Common to Proposed Actions

Short-term loss and interruption of natural soil processes and functions (e.g., soil development, infiltration, percolation, water holding capacity, structure, and organic matter) can be reversed by natural soil development over an unknown period of time. Appropriate reclamation efforts expedite those natural soil development processes. Loss of vegetation productivity as a result of soil impacts and land uses could be reversed within about 5 years after successful reclamation.

VEGETATION RESOURCES

SUMMARY

The Fish Springs Ranch and Intermountain Water Supply Projects would have short-term direct effects to sagebrush, grassland, and juniper woodland communities during construction of the respective water transmission pipelines. Concurrent reclamation would establish grasses and forbs on disturbed pipeline rights-of-way, but would likely take 10 or more years to re-establish sagebrush and juniper communities.

Construction of water transmission pipelines would result in temporary disturbance of approximately 395 acres vegetation for the Fish Springs Ranch Project and 241 acres for the Intermountain Water Supply Project. Vegetation communities would be permanently removed during construction of wellheads, pumping stations, storage and surge tanks, and an electrical substation. Disturbance of existing vegetation would increase potential for noxious weeds and other invasive species to proliferate and spread to adjacent undisturbed areas. Implementation of Alternative A would reduce loss of vegetation by approximately 28 acres.

No sensitive species or plants listed under the Endangered Species Act would be affected by the proposed Projects. Cacti protected under Nevada law would be salvaged and replanted in undisturbed habitats.

Based on results of groundwater modeling, some wetland plant communities could be reduced or eliminated as a result of lowered groundwater levels and/or reduced flow from springs and flowing wells resulting from groundwater drawdown created by pumping wells in eastern Honey Lake Valley, western Dry Valley, and northwestern Bedell Flat. Lowering groundwater levels due to pumping could also cause ground subsidence within the zone of influence in some areas of unconsolidated sediment.

Approximately 70 non-wetland drainages would be crossed by the proposed water transmission pipelines. Assuming a construction width of 50 feet and length of 10 feet for each drainage crossing, less than 1.0 acre of non-wetlands waters of the U.S. would be affected by construction of the proposed pipelines. Short-term disturbance to the channels bed and bank would occur during construction activities .A few of these drainages have riparian vegetation and may be considered jurisdictional wetlands (Section 404 wetland delineation and permitting process underway for U.S. Army Corps of Engineers).

Some wetland areas within the groundwater drawdown zone of influence could be reduced or eliminated as a result of lowered groundwater levels and/or reduced flow from springs and flowing wells. Total wetland-type habitat that could potentially be affected by groundwater drawdown is approximately 16 acres combined in Honey Lake Valley (including southern Smoke Creek Desert), Dry Valley, and Bedell Flat. Less than half of these areas would be expected to experience adverse effects from *groundwater pumping because of the distance from pumping wells to the springs/flowing wells, and/or the lack of connection to the regional groundwater system.*

DIRECT AND INDIRECT IMPACTS

Impacts Common to Proposed Actions

The Proposed Actions would have short-term direct affects to sagebrush, grassland, and juniper woodland communities during construction of the respective water transmission pipelines. Upland vegetation communities would be permanently removed during construction of wellheads, pumping stations, storage and surge tanks, and an electrical substation.

Riparian vegetation associated with some ephemeral and intermittent drainages would also be removed during construction of the proposed pipelines. Approximately 70 non-wetland ephemeral or intermittent drainages would be crossed by water transmission pipelines. Assuming a construction width of 50 feet and length of 10 feet for each drainage crossing, less than 1.0 acre of non-wetlands waters of the U.S. would be affected by construction of the proposed pipelines.

Reclamation immediately following construction would reestablish vegetation on areas disturbed by pipeline construction within 3 to 5 years. Reclamation would reestablish self-sustaining vegetation on areas of the buried pipeline systems disturbed by construction; however, reestablished vegetation would differ in composition and diversity for several years from vegetation that existed prior to construction. On areas where sagebrush or junipers are removed, reestablishment of these communities could take 10 or more years. Typically, sagebrush has been difficult to establish on pipeline rights-of-way in the Projects Area (i.e., Tuscarora Pipeline). Over the short-term (3 to 5 years), grasses and forbs would likely dominate the vegetation community on reclaimed areas along the buried pipeline corridors.

Disturbed sites and recently seeded areas would be susceptible to invasion by undesirable species such as noxious weeds and cheatgrass. Noxious weed invasion would hinder establishment of desirable vegetation including native species. Dust from roads and construction activities coating vegetation in areas adjacent to or downwind from dust sources may predispose some species to insect infestation.

Based on results of groundwater modeling (see "*Water Resources*" section in this chapter), some wetland plant communities could be reduced or eliminated as a result of lowered groundwater levels and/or reduced flow from springs and flowing wells resulting from groundwater drawdown created by pumping wells in eastern Honey Lake Valley (8,000 af/yr), western Dry Valley (2,000 af/yr), and northwestern Bedell Flat (500 af/yr). Based on spring/seep survey conducted by Westech (2004a), total wetland-type habitat that could be affected by groundwater drawdown is approximately 10 acres in Honey Lake Valley (including southern Smoke Creek Desert), 1 acre in Dry Valley, and 5 acres in Bedell Flat (see "*Water Resources*" section in this chapter). Less than half of these areas could experience any adverse effects from groundwater pumping because of the distance from pumping wells to the springs/flowing wells, and/or the lack of connection to the regional groundwater system. An indirect effect could be fugitive dust created by bare ground resulting from loss of riparian/wetland vegetation (see *"Air Resources"* section in this chapter).

Lowering groundwater levels due to pumping could also cause ground subsidence within the zone of influence (see "*Water Resources*" section in this chapter) in some areas of unconsolidated sediment. Ground subsidence could affect subsurface discharge paths of water from springs and affect surface topography. If subsidence were to occur, drainage patterns to and from wetlands could be altered. Consequently, affected wetlands could increase or decrease in size depending on site-specific topographic and hydrological features affected.

No BLM-sensitive species or species listed as threatened or endangered under the Endangered Species Act (e.g., Steamboat buckwheat) would be affected by the proposed Projects. One species, however, of concern to the state of Nevada (Rams Horn Spring milkvetch), growing on private and public land at Bedell Flat and Antelope Valley, could be affected by pipeline construction. It is unlikely that loss of a few individuals would affect the viability of local or regional populations. However, studies of distribution and population locations of Rams Horn Spring milkvetch have not been conducted over much of Nevada. Populations of cactus protected under Nevada law would likely be removed. Impacts to cactus would be mitigated by conducting searches for cacti of areas to be disturbed, then salvaged and replanted. Indirect effects of the Proposed Actions would include potential movement of weedy species from reclaimed areas to adjacent stands of native vegetation.

Service Area

Current vegetation would be removed in the Service Area (Stead/Lemmon Valley Area) where houses, commercial buildings, and roads would be constructed. Some of the natural open-range type vegetation would be replaced with urban landscaping including lawns, bushes, and trees associated with the new housing and commercial developments.

Impacts Unique to Fish Springs Ranch Project

The Fish Springs Ranch Proposed Action would have short-term impacts to approximately 395 acres (225 acres public land and 170 acres private land) of sagebrush, grassland, and juniper communities during construction of the water transmission pipeline. Approximately 10 acres (4 acres public land and 6 acres private land) of upland vegetation would be permanently removed during construction of wellheads, pumping station, storage and surge tanks, and electrical substation. This Proposed Action would have the same types of impact on vegetation as described previously in "*Impacts Common to Proposed Actions".*

Groundwater drawdown resulting from pumping 8,000 af/yr from production wells at Fish Springs Ranch would have potential to cease or decrease flow from some springs and flowing wells in eastern Honey Lake Valley and southern Smoke Creek Desert. The primary group of flowing springs and wells that could be affected by groundwater pumping consists of 10 wells and five springs located in southern Smoke Creek Desert (HLV-168 through HLV-183, excluding HLV-170 and HLV-181, on **Figure 4-1** and **Table 4-4**). According to groundwater model results, all of the noted springs and wells in southern Smoke Creek Desert may be subject to 5 to 10 feet of groundwater drawdown due to the proposed pumping of 8,000 af/yr. Assuming 5 to 10 feet of drawdown does eventually occur in this part of Smoke Creek Desert, the flowing springs and wells could experience flow reductions. The magnitude of impact, if any, would depend on the source's connection with the aquifer subject to production well pumping, and the initial head or water pressure at each spring and flowing well.

Total riparian or wetland area associated with the springs and flowing well sites in eastern Honey Lake Valley, including southern Smoke Creek Desert, is approximately 13 acres (Westech 2004a). Most of this area (approximately 9 acres) is in the southern Smoke Creek Desert area, located over 10 miles from proposed pumping wells at Fish Springs Ranch. Vegetation in approximately 10 acres of these areas could be reduced if the water source is diminished (e.g., flow from springs and wells), or shallow groundwater levels are lowered below the plants' rooting depth, due to proposed production well pumping at Fish Springs Ranch. Less than half of these areas would potentially experience adverse effects from groundwater pumping because of the distance from pumping wells to the springs/flowing wells, and/or the lack of connection to the regional groundwater system. Lowering groundwater levels caused by the proposed production wells would occur gradually over a period of 100 years or more.

One spring site (HLV-206) is located between the projected 15- and 20-foot groundwater drawdown contours (**Figure 4-1**), but there was no flow observed in 2004 (Westech 2004a). A small (<0.1 acre) depressional wetland is present at this site which is assumed to be maintained by surface water and probably would not be affected by groundwater drawdown.

Two historically flowing well sites (HLV-202 and HLV-203) are located between the 10- to 15-foot groundwater drawdown contours and one well (HLV-201) is between the 0 and 5-foot drawdown contour as predicted by the model (**Figure 4-1**). The three sites have the following observed riparian or wetland areas: HLV-201 = <0.01 acre, HLV-202 = <0.01 acre, and HLV-203 = approximately 0.2 acre (Westech 2004a). Riparian vegetation along a drainage channel at site HLV-201 appears to be maintained by intermittent water in the channel and possibly some subsurface water in channel alluvium. Riparian vegetation at site HLV-202 appears to be maintained by shallow groundwater that could be lowered by proposed groundwater pumping. Riparian vegetation at site HLV-203 appears to be supported by some surface water in Anderson Canyon and from a leaking capped well. This site could be adversely affected if groundwater drawdown substantially lowers the well's water level.

Conversion of Fish Springs Ranch's irrigated alfalfa hay production fields to a self-sustaining vegetative cover would result in modifying the plant species on approximately 1,242 acres in eastern Honey Lake

Valley. The irrigated hay meadows would be converted to dryland species including crested wheat grass, kochia, and fourwing saltbrush. The Fish Springs Ranch Conversion Plan is described in Chapter 2. Establishment of the dryland seed mix would provide seasonal forage for livestock and wildlife and would not require irrigation to sustain the vegetative cover.

Impacts Unique to Intermountain Water Supply Project

The Intermountain Water Supply Proposed Action would have short-term impacts to approximately 241 acres (142 acres public land and 99 acres private land) of sagebrush, grassland, and juniper communities during construction of the water transmission pipeline. Approximately 1.0 acre (0.8 acre public land) of upland vegetation would be permanently removed during wellhead development and construction of a pumping station and storage tanks. This Proposed Action would have the same types of impact on vegetation as described in "*Impacts Common to Proposed Actions".*

The Intermountain Water Supply Project would have potential to cease or decrease flow from four springs in Dry Valley (**Figure 4-2**) and six springs in Bedell Flat (**Figure 4-3**) (see "*Water Resources*" section in this chapter). This could reduce available water that supplies wetland habitat associated with these springs. Additionally, wetland vegetation could be affected if shallow unconfined groundwater levels (<10 feet in some areas of Dry Valley) are lowered below the plants' rooting depth. Depth to groundwater in Bedell Flat wells generally is greater than about 50 feet below ground surface. The primary source of water for wetland habitat would be from the springs and not from underlying shallow groundwater.

Based on groundwater model predictions and identification of spring areas by Westech (2004a), approximately 1 acre out of 4 acres of riparian/wetland habitat could be lost or degraded as a result of groundwater drawdown within the zone of influence in Dry Valley, and 5 acres of similar habitat could be affected in Bedell Flat. As previously stated, however, it is expected that less than half these areas would be adversely affected by proposed pumping because of the distance from pumping wells to the springs/flowing wells, and/or the lack of connection to the regional groundwater system. Lowering groundwater levels caused by the proposed production wells would occur gradually over a period of 100 years or more.

ALTERNATIVE A – CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

This alternative would reduce short-term disturbance to vegetation from pipeline construction by approximately 28 acres. Disturbed areas associated with pipeline crossing of non-wetland waters of the U.S. would be reduced for Alternative A. Potential impacts to wetlands from groundwater drawdown would be similar to effects described for "*Impacts Common to Proposed Actions".*

NO ACTION ALTERNATIVE

No Action for Fish Springs Ranch Project

Under the No Action Alternative, Fish Springs Ranch could continue to pump groundwater for irrigation purposes using permits previously approved by the Nevada State Engineer. Such groundwater extraction could cause seasonal lowering of groundwater levels similar to those described previously for baseline conditions. Withdrawal of groundwater for irrigation occurs seasonally which allows for some groundwater recovery during periods of non-pumping. Groundwater extraction of about 4,200 af/yr for irrigation purposes from five wells at Fish Springs Ranch over the last 10 years may have contributed to elimination and reduction of flow from some springs and flowing wells (e.g., Fish Springs and Lime Rock/Desert Wells), and also may have eliminated or reduced some wetland areas.

Selection of the No Action Alternative for the Fish Springs Ranch Project would eliminate predicted impacts to vegetation associated with this Proposed Action. However, to the extent that Fish Springs Ranch could proceed with groundwater extraction and distribution on private land under their water rights, some vegetation associated with springs and/or flowing wells could be affected.

Construction-related impacts to vegetation for the water transmission pipelines (e.g., short-term disturbance of drainage channels) would not occur under the No Action Alternative. All other vegetation-related impacts described previously for the action alternatives would not occur under the No Action Alternative.

No Action for Intermountain Water Supply Project

Under the No Action Alternative, Intermountain Water Supply could pump groundwater for beneficial uses approved by the State Engineer, up to the amount of water provided in their existing water rights. Such groundwater extraction and distribution, however, would not occur on public land. No specific uses for water other than those described in the Proposed Action for Intermountain Water Supply have been identified.

Selection of the No Action Alternative for the Intermountain Water Supply Project would eliminate projected impacts to vegetation associated with this Proposed Action. To the extent that Intermountain Water Supply could proceed with groundwater withdrawal and distribution on private land under their water rights, some vegetation associated with springs could be affected.

MONITORING AND MITIGATION MEASURES

Measures Common to Proposed Actions

Potential measures to mitigate and monitor for impacts to vegetation resulting from construction of the pipelines and associated facilities include:

- Use variable seed mixes adapted to slope and aspect, soil depth, and landscape features to reclaim areas disturbed by construction.
- Seed and plant shrubs (including sagebrush) in patches rather than uniformly over the area.
- Prevent livestock grazing of reclamation until stable and resilient vegetation cover has been established.
- Monitor disturbed and reclaimed areas for noxious weeds and other undesirable species; if noxious weeds are found, they would be controlled.
- Monitor reclamation yearly to assess success of seeding and planting and implement remedial measures if needed.
- Water roads during construction to minimize impacts from dust.
- Conduct searches for cacti and transplanting them to suitable habitat undisturbed by proposed activities.
- Wetland banking or other off-site mitigation, if required by the U.S. Army Corps of Engineers, could be implemented if adverse impacts occur to wetland areas.

Appendix D - *Recommended Water Resources Monitoring and Management Plan* identifies possible monitoring and management measures that could be implemented to address potential impacts from groundwater pumping and lowered groundwater levels within and surrounding Honey Lake Valley, Dry Valley, and Bedell Flat.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Fish Springs Ranch Project

The Fish Springs Ranch Proposed Action would result in the irreversible and irretrievable loss of about 10 acres of sagebrush, grassland, and juniper plant communities from construction of permanent facilities. Loss or reduction in flow from springs/wells and associated wetlands would be for the duration of the Project, but if groundwater pumping were stopped, flows from springs/wells and associated wetland vegetation could eventually recover to approximate pre-project levels. This recovery period is unknown, but likely would require several years depending on the total period of pumping, extent of wetland habitat loss, and whether recovery occurs naturally or is assisted through a revegetation program.

Intermountain Water Supply Project

The Intermountain Water Supply Proposed Action would result in the irreversible and irretrievable loss of less than 1.0 acre of sagebrush, grassland, and juniper communities from construction of permanent above-ground facilities. Loss or reduction in flow from springs/wells and associated wetlands would be for the duration of the Project, but if groundwater pumping were stopped, flows from springs/wells and associated wetland vegetation could eventually recover to approximate pre-project levels after several years.

RESIDUAL EFFECTS

Effects Common to Proposed Actions

Residual effects would remain where lowered groundwater levels and/or reduced flow from springs/wells caused by production well pumping would have a permanent effect on associated vegetation, including wetlands, unless mitigation measures would maintain vegetative conditions.

WILDLIFE RESOURCES

SUMMARY

Direct impacts to wildlife resources resulting from the Proposed Actions would be short-term loss of habitat and displacement or loss of wildlife as a result of construction activities. Construction of permanent above-ground facilities would remove habitat and displace wildlife. Most wildlife species in the Projects Area are associated with sagebrush and grassland communities and juniper woodlands. Construction of well heads, pump stations, storage tanks, and electrical substation would result in approximately 10 acres of permanent habitat loss associated with the Fish Springs Ranch Project and 1 acre of habitat loss with the Intermountain Water Supply Project. Construction of water transmission pipelines would result in temporary disturbance of approximately 395 acres habitat for the Fish Springs Ranch Project and 241 acres for the Intermountain Water Supply Project. Implementation of Alternative A would reduce the amount of habitat that would be disturbed by approximately 28 acres.

Depending on success of reclamation, habitat disturbed by pipeline construction would have reduced capacity to support existing wildlife populations for 3 to 5 years or longer. Species dependent on sagebrush habitat could experience reduced habitat quality if sagebrush does not re-establish on reclaimed pipeline rights-of-way and other areas. Breeding and foraging habitat for sage grouse, a sensitive species, would be reduced as a result of the Projects; however, this loss would not likely affect regional populations and distribution of sage grouse once successful reclamation has been achieved. No known historic grouse leks would be affected.

The threatened bald eagle would not likely be affected by the proposed Projects through reduction or loss of short-term foraging opportunities in upland habitats and long-term effects due to possible reductions in wetland habitat. This change in wetland habitat, if any, would be a result of lowered groundwater levels and/or reduced flow from springs and flowing wells resulting from proposed production well pumping. The Fish Springs Ranch proposed pumping could result in a minor reduction of natural groundwater flow to Pyramid Lake Valley from eastern Honey Lake Valley and Smoke Creek Desert (via Astor and Sand Passes). The potential reduction in groundwater recharge to Pyramid Lake would not affect Lahontan cutthroat trout and Cui-ui. There would be no effect on surface flow to Pyramid Lake in the Truckee River, which is the major component of source water to the lake.

The endangered Carson wandering skipper would not be directly affected by habitat removal from pipeline construction activity and permanent facilities (no loss of habitat would occur). Reduction in flow from springs or flowing wells resulting from groundwater extraction may affect the Carson wandering skipper through loss of some habitat. Potential habitat loss for the bald eagle is expected to be minor in a regional context due to other springs and wetlands in the area that have little or no potential of being affected by groundwater withdrawal from the Proposed Actions.

DIRECT AND INDIRECT IMPACTS

Impacts Common to Proposed Actions

Impacts to wildlife resources within and adjacent to the proposed rights-of-way would be short-term and occur during construction of water transmission pipelines. Construction of the proposed pipelines would remove sagebrush, grassland, and juniper habitat through ground disturbance, removal of vegetative cover, activities associated with preparation and installation of pipelines, and restoration of surface contours. Wildlife would also be affected during construction by vehicular traffic, blasting, and increased levels of human activity.

Wildlife species dependent on these disturbed sites would be killed or displaced. Displaced animals may be incorporated into adjacent populations, depending on variables such as species behavior, density, and habitat quality. Adjacent populations may experience increased mortality, decreased reproductive rates, or other compensatory or additive responses.

Species that would experience greatest impacts from loss of sagebrush and grassland habitats include black-tailed jackrabbit, mountain cottontail, mule deer, and pronghorn antelope. Mule deer and antelope using the Study Area would be displaced during construction activities. Removal of sagebrush habitat would reduce capacity of the Projects Area to support regional populations of mule deer and antelope by a small incremental amount. Due to the difficulty of successful reestablishing sagebrush on pipeline rights-of-way, adverse effects from habitat loss could extend for longer than 5 years.

Lizards and snakes would be killed by construction activities and vehicle traffic. Lizards and snakes often seek cover underground and removal of soil and rock would result in direct mortality. No reptiles have been identified in the Study Area for which reduced population viability or reduction in habitat poses a threat to their continued existence regionally and locally.

Migratory birds that would experience loss of foraging and nesting habitats in sagebrush-grasslands and juniper woodlands include western kingbird, horned lark, northern flicker, gray flycatcher, ash-throated flycatcher, pinyon jay, mountain chickadee, house wren, blue-gray gnatcatcher, mountain bluebird, green-tailed towhee, spotted towhee, chipping sparrow, loggerhead shrike, Say's phoebe, horned lark, rock wren, lark sparrow, western meadow lark, American kestrel, American robin, Brewer's sparrow, vesper sparrow, sage sparrow, and sage thrasher. If construction were to take place in the nesting and brood-rearing period, young birds would be killed and nests would be destroyed.

Raptors would be affected by loss of prey base in sagebrush/grasslands and potential nesting habitat in juniper woodlands. Because most raptors usually range over a large area, this loss would not be quantifiable and would not result in a change in raptor diversity. Some raptors would be able to take advantage of prey availability in reclaimed habitats. Often in the early stages of reclamation, growth of grasses and forbs on pipeline rights-of-way are attractive to rabbits, mice, and voles; favored prey for a number of raptor species. No known raptor nests would be directly affected by the Proposed Actions.

Noise levels associated with the Proposed Actions would increase primarily during the construction period, displacing some animals an unknown distance from the noise source. Some species would likely abandon habitat near high levels of noise and human disturbance; whereas, others would become accustomed to noise and associated human activity and resume their use of otherwise unaffected habitat.

Service Area

Some current wildlife populations in the Service Area would be affected due to increased numbers of houses, commercial buildings, roads, and general increase in human activity. Increased use of public land adjacent to planned development would also cause displacement of wildlife from areas frequented by public land users. Some wildlife would be permanently displaced, whereas others would adapt to the changing conditions.

Special Status Species

BLM has submitted a Biological Report to the US Fish and Wildlife Service detailing the potential effects the proposed Projects could have on threatened and endangered species. BLM has determined that potential impacts resulting from the pipeline projects would not adversely impact any threatened and endangered species in the Projects Area and as such, formal consultation with U.S. Fish and Wildlife Service is not required.

Bald Eagle (Threatened)

Although bald eagles are primarily associated with aquatic habitats because of the presence of fish and waterfowl (favored winter prey), they also forage over upland sites for rodents and carrion. Potential winter foraging habitat for bald eagles would be reduced over the short-term (3 to 5 years) until grasses and forbs become established on water transmission pipeline rights-of-way. With establishment of herbaceous species on areas disturbed by construction activities, availability of prey species (e.g., black-tailed jackrabbits, cottontail rabbits, and other small mammals) would equal or surpass existing population densities. Short-term incremental reduction in the prey base of these species would slightly reduce foraging areas for the bald eagle, but this reduction would be slight in a regional context and would not affect population density and distribution.

Possible reduction or loss of flow from springs and flowing wells resulting from groundwater pumping and associated drawdown could degrade waterfowl habitat associated with affected water discharges. Ducks often feed and rest at areas of surface water during migration and over winter. During winter when other surface water sources are frozen, springs and flowing wells often remain free of ice and are attractive to ducks and other waterfowl. Reductions in waterfowl winter habitat may adversely affect bald eagles through reduced foraging opportunities; however, reduced wintering habitat at affected springs could also tend to concentrate waterfowl use at unaffected springs, rendering waterfowl more susceptible to eagle predation.

Riparian or wetland habitat associated with springs and flowing wells that could potentially be affected by groundwater drawdown totals approximately 16 acres in Honey Lake Valley (including southern Smoke Creek Desert), Dry Valley, and Bedell Flat. However, it is expected that less than half of these areas could experience any adverse effects from groundwater pumping because of the distance from pumping wells to the springs/flowing wells, and/or the lack of connection to the regional groundwater system. From a regional perspective, the spring and wetland areas that could be affected by production well pumping would be minor, and numerous other surface water sites in the Study Area would not be affected by proposed pumping.

Lahontan Cutthroat Trout (Threatened)

Lahontan Cutthroat trout in Pyramid Lake would not be affected by construction of water transmission pipelines and infrastructure. Potential effects from groundwater pumping on recharge to Pyramid Lake, if any, would be slight and not affect Lahontan cutthroat trout. Groundwater pumping from the Intermountain Water Supply Project would not affect groundwater recharge to Pyramid Lake.

Cui-ui (Endangered)

Cui-ui in Pyramid Lake would not be affected by construction of pipelines and infrastructure. Potential effects from groundwater pumping on recharge to Pyramid Lake, if any, would be slight and not affect Cui-ui. Groundwater pumping from the Intermountain Water Supply Project would not affect groundwater recharge to Pyramid Lake.

Carson Wandering Skipper (Endangered)

Construction of pipelines and permanent facilities associated with the Fish Springs Ranch Project and Intermountain Water Supply Project would not directly affect habitat for the Carson wandering skipper (no loss of habitat would occur). Reduction in flow from springs or flowing wells resulting from groundwater withdrawal may affect the Carson wandering skipper through loss of some habitat. Potential Carson wandering skipper habitat that may be affected by the Proposed Actions is present at the following areas (Sanford 2004a): Cal Neva Road, South Alkali Flat, and East Alkali Flat in eastern Honey Lake Valley; West Smoke Creek in southern Smoke Creek Desert; Upper and Lower Dry Valley; and Bedell Flat NW01 and NW02 (**Figures 3-7** and **4-1**). These areas are discussed in more detail under the sections "*Impacts Unique to Fish Springs Ranch Project*" and "*Impacts Unique to Intermountain Water Supply Project*".

Sensitive Species

Bats

Construction activities and removal of habitat may have short-term effects on bats through displacement from foraging habitat; however, no caves, mine, adits, or other habitats favored as roosting and breeding areas for bats would be affected by the proposed Projects. Reduction or loss of flow from springs or flowing wells due to effects of lowered groundwater levels from production well pumping could adversely affect bats. These water sources typically have open water surfaces and wetlands important to foraging bats. Water sources are critical to bats because they drink from open water and insects are more abundant around wetlands and open water. Studies in desert habitats have found that bat activity is 40 times greater near wetlands and riparian areas than in upland areas (Nevada Bat Working Group 2002). High-elevation tree roosting bats also fly to open water, wetlands, and riparian areas to drink and forage.

Pygmy Rabbit

Potentially suitable pygmy rabbit habitat along water transmission pipeline corridors would be removed; however, pygmy rabbits are not known to occur in the Study Area; consequently, the Proposed Actions would not directly affect this species. Loss of sagebrush habitat would be a small incremental reduction locally and regionally, but would not affect population viability of distribution regionally.

Preble's Shrew

Potential habitat for Preble's shrew (sagebrush/grasslands and wetlands) could be affected by the proposed Projects. It is not known if Preble's shrew is present in the Study Area. If present, the proposed Projects could result in direct mortality through excavation and other construction activities. Little is known about the life history, distribution, and ecology of this species. Consequently, it is uncertain how loss of habitat and potential direct mortality from the Proposed Actions would affect viability of local populations. Because of wide geographic distribution of this species and apparent broad range of habitat, it is likely that the proposed Projects would have little effect on regional populations.

Sage Grouse

No active sage grouse courtship sites (leks) would be affected by the Proposed Actions; however, sagebrush, grassland and riparian habitats that would be removed provide nesting, brood rearing, and wintering habitat. If construction were to take place during the nesting and brood-rearing period, mortality to chicks and nestlings could occur. The Proposed Actions could result in incremental removal of habitat and an associated reduction in the capacity of local and regional habitats to support sage grouse.

Swainson's and Ferruginous Hawks

The proposed Projects would remove foraging habitat over the short-term along water transmission pipeline rights-of-way for Swainson's and ferruginous hawks, but no known nest sites would be affected. Incremental reduction in prey base of these species by the proposed Projects would reduce the foraging area for these raptors for 3 to 5 years, but this reduction would represent a small percentage in a regional context and would not likely affect population density.

Impacts Unique to Fish Springs Ranch Project

The Fish Springs Ranch Proposed Action would directly affect approximately 225 acres of wildlife habitat on federal land and 170 acres of habitat on private land (see **Table 2-1**). Of this acreage, 10 acres would be permanently affected due to constructed above-ground facilities (e.g., pump stations, wells, storage tanks, and electrical substation). The remaining 385 acres would be temporary disturbance associated with the construction of the buried water transmission pipelines. This Proposed Action would have the same type of impacts on wildlife and wildlife habitat as described in "*Impacts Common to Proposed Actions".*

The Fish Springs Ranch Project would have the potential to eliminate or decrease flow in several springs and flowing wells (see "*Water Resources*" section in this chapter), thereby possibly reducing available surface water and wetland habitat. **Figure 4-1** shows the maximum steady-state groundwater drawdown area predicted by a model for proposed pumping of 8,000 af/yr in eastern Honey Lake Valley.

Total riparian or wetland area associated with the springs and flowing well sites in eastern Honey Lake Valley, including southern Smoke Creek Desert, is approximately 13 acres (Westech 2004a). Most of this area (approximately 9 acres) is in the southern Smoke Creek Desert area, located over 10 miles from proposed pumping wells at Fish Springs Ranch. Wildlife habitat in approximately 10 acres of these areas could be reduced if the water source is diminished (e.g., flow from springs and wells), or shallow groundwater levels are lowered below the plants' rooting depth, due to proposed production well pumping at Fish Springs Ranch. Less than half of these areas would potentially experience adverse effects from groundwater pumping because of the distance from pumping wells to the springs/flowing wells, and/or the lack of connection to the regional groundwater system. Lowering groundwater levels caused by the proposed production wells would occur gradually over a period of 100 years or more.

Special-Status Species

Lahontan Cutthroat Trout

Groundwater recharge to Pyramid Lake could be affected by groundwater depletions in aquifers resulting from proposed pumping (see "*Water Resources"* section in this chapter). Natural groundwater flow to Pyramid Lake Valley from eastern Honey Lake Valley via Astor Pass and from Smoke Creek Desert could be reduced by about 10 percent due to proposed pumping at Fish Springs Ranch. This estimate does not consider groundwater recharge to Pyramid Lake from other areas nor the contribution of the Truckee River. The Truckee River, primary source of recharge to Pyramid Lake, on average discharges about 410,000 af/year to the lake. Estimated maximum reduction of groundwater flow to Pyramid Lake Valley from pumping at Fish Springs Ranch (i.e., 650 af/yr) would be about 0.2 percent of surface water flow to the lake from the Truckee River. The decrease, if any, in groundwater recharge to Pyramid Lake resulting from pumping at Fish Spring Ranch would not affect Lahontan cutthroat trout. The Truckee River as primary source of recharge to Pyramid Lake and the only spawning location for the Pyramid Lake population of Lahontan cutthroat trout would not be affected by the proposed Fish Springs Ranch Project.

Although modeling indicates that groundwater recharge to Pyramid Lake could be reduced by groundwater pumping in eastern Honey Lake Valley, some investigators do not believe that there is a groundwater connection between Honey Lake Valley, Smoke Creek Desert, and Pyramid Lake Valley (Bohm 1990; Moll 2000; Varian 1997). If this is the case, proposed pumping at Fish Springs Ranch would not affect groundwater recharge to Pyramid Lake.

Cui-ui

Potential effects from groundwater pumping on Cui-ui would be similar to effects on Lahontan cutthroat trout. Slight reductions in groundwater flow from Honey Lake Valley to Pyramid Lake Valley, if any, would not affect spawning habitat or the primary water source to Pyramid Lake, the Truckee River.

Carson Wandering Skipper

Some areas in eastern Honey Lake Valley within the predicted groundwater drawdown zone of influence are potentially suitable habitat for Carson wandering skipper (Cal Neva Road, South Alkali Flat, East Alkali Flat, and West Smoke Creek; **Figure 4-1**), although the species has been documented at only one of these locations (East Alkali Flat). Habitat in the East Alkali Flat area, however, does not appear to be optimal for this butterfly species (Sanford 2004a). Edges of playas appear to provide the best habitat for Carson wandering skipper; such habitat, however, is rare in the Projects Area east of Honey Lake (Sanford 2004a).

Carson wandering skipper habitat quality at East Alkali Flat would decrease if groundwater pumping dries out salt grass habitat. Similarly, groundwater pumping, if it results in desiccation of potential Carson wandering skipper habitat, would reduce habitat quality at other sites of potentially suitable habitat in eastern Honey Lake Valley and southern Smoke Creek Dessert, although the skipper has not been documented to use potential habitat at these locations.

Impacts Unique to Intermountain Water Supply Project

The Intermountain Water Supply Proposed Action would directly affect approximately 241 acres, of which 142 acres are public land and 99 acres are private land. Construction along water transmission pipeline corridors would temporarily decrease habitat quality on these areas. Construction of permanent facilities (e.g., pumping station, wells, and storage tanks) would affect less than 1 acre on private land. This Proposed Action would have the same types of impact on wildlife and wildlife habitat as described previously in "*Impacts Common to Proposed Actions".*

Based on groundwater model results, the Intermountain Water Supply Project could eliminate or decrease flow from four springs in Dry Valley and six springs in Bedell Flat (see "*Water Resources*" section in this chapter). Groundwater pumping could reduce available water that supplies wetland habitat associated with these springs. **Figures 4-2** and **4-3** show the maximum steady-state groundwater drawdown area predicted by flow models for proposed pumping of 2,000 af/yr in Dry Valley and 500 af/yr in Bedell Flat, respectively. Wetland vegetation could be affected if shallow unconfined groundwater levels are lowered below the plants' rooting depth. Depth to groundwater in some Dry Valley wells is less than 10 feet below ground surface; therefore, lowering this water table could adversely affect wetland habitat where plant roots extend to depths approaching 10 feet. Depth to groundwater in Bedell Flat wells generally is greater than about 50 feet below ground surface; therefore, the primary source of water for wetland habitat would be from the springs and not from underlying shallow groundwater.

Based on groundwater model predictions and identification of spring areas by Westech (2004a), approximately 1 acre out of 4 acres of riparian/wetland habitat could be lost or degraded as a result of groundwater drawdown within the zone of influence in Dry Valley, and 5 acres of similar habitat could be affected in Bedell Flat. As previously stated, less than half these areas likely would be adversely affected by proposed pumping because of the distance from pumping wells to the springs/flowing wells, and/or the lack of connection to the regional groundwater system. These areas, if adversely affected, also could affect wildlife. Lowering groundwater levels caused by the proposed production wells would occur gradually over a period of 100 years or more.

Lahontan Cutthroat Trout and Cui-ui

Groundwater pumping from Intermountain Water Supply wells in Dry Valley and Bedell Flat would not affect groundwater recharge to Pyramid Lake; consequently, these proposed Projects would not affect Lahontan cutthroat trout or Cui-ui.

Carson Wandering Skipper

Some areas in the Study Area are potentially suitable habitat for Carson wandering skipper, although the species has not been documented in Dry Valley or Bedell Flat (Sanford 2004a). Potential habitat for Carson wandering skipper has been identified by Sanford (2004a) at Upper and Lower Dry Valley areas (**Figure 4-2**), and Bedell Flat NW01 and NW02 (**Figure 4-3**). The two habitat areas in Dry Valley could be affected by proposed production well pumping where springs DVC-81 and DVC-82 provide water to the Dry Valley Creek channel bottom area (**Figure 4-3**). The two Carson wandering skipper habitat areas in Bedell Flat could be affected by lowered groundwater levels from groundwater pumping because the Campbell/Raintree spring (BF-142) is located in these areas (**Figure 4-3**). Edges of playas may provide the best habitat for Carson wandering skipper; this habitat, however, is rare in Dry Valley and Bedell Flat (Sanford 2004a).

It is unknown if groundwater pumping from wells in lower Dry Valley would affect Carson wandering skipper habitat in Winnemucca Valley (see "*Water Resources*" section in this chapter). Groundwater pumping from Bedell Flat could reduce natural groundwater flow (780 af/yr) to Warm Springs Valley by 160 af/yr. The USGS (Lopes and Evetts 2004) estimates that there is 6,000 af/yr of natural recharge to groundwater in Warm Springs Valley, with 5,000 af/yr currently being pumped from the valley (including Winnemucca Valley). If proposed groundwater pumping from Bedell Flat and/or Dry Valley reduces groundwater flow to Warm Springs Valley (including Winnemucca Valley), adverse effects from existing groundwater pumping on Carson wandering skipper habitat in Winnemucca Valley could be exacerbated.

Brussard *et al.* (1999) indicates that drawdown from domestic wells is a threat to habitat for the Carson wandering skipper at the Winnemucca Ranch Road site. It is likely that at the existing rate of groundwater withdrawal from Warm Springs Valley (approximately 5,000 af/yr), Carson wandering skipper habitat maintained by groundwater discharge could be affected as groundwater drawdown areas expand.

ALTERNATIVE A – CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

This alternative would reduce short-term disturbance of wildlife habitat from pipeline construction by 28 acres. Disturbed areas associated with pipeline crossing of non-wetland waters of the U.S. would be reduced for Alternative A. Potential impacts to springs and wetlands from lowered groundwater levels associated with production well pumping would be similar to effects described for "*Impacts Common to Proposed Actions*".

NO ACTION ALTERNATIVE

No Action for Fish Springs Ranch Project

Under the No Action Alternative, Fish Springs Ranch could continue to pump groundwater for irrigation purposes using permits previously approved by the Nevada State Engineer. Such groundwater extraction could cause seasonal lowering of groundwater levels similar to those described previously for baseline conditions. Withdrawal of groundwater for irrigation occurs seasonally which allows for some groundwater recovery during periods of non-pumping. Groundwater extraction of about 4,200 af/yr for irrigation purposes from five wells at Fish Springs Ranch over the last 10 years may have contributed to elimination and reduction of flow from some springs and flowing wells (e.g., Fish Springs and Lime Rock/Desert Wells), and also may have eliminated or reduced some wetland areas.

Selection of the No Action Alternative for the Fish Springs Ranch Project could eliminate predicted impacts to wildlife resources associated with this Proposed Action. However, to the extent that Fish Springs Ranch could proceed with groundwater extraction and distribution on private land under their water rights, some wildlife species that rely on springs and/or flowing wells for water could be affected.

Construction-related impacts to wildlife for the water transmission pipelines would not occur under the No Action Alternative. All other wildlife-related impacts described previously for the action alternatives would not occur under the No Action Alternative.

No Action for Intermountain Water Supply Project

Under the No Action Alternative, Intermountain Water Supply could pump groundwater for beneficial uses approved by the State Engineer, up to the amount of water provided in their existing water rights. Such pumping and distribution, however, would not occur on public land. No specific uses for water other than those described in the Proposed Action for Intermountain Water Supply have been identified.

Selection of the No Action Alternative for the Intermountain Water Supply Project could eliminate predicted impacts to wildlife resources associated with this Proposed Action. However, to the extent that Intermountain Water Supply could proceed with groundwater withdrawal to exercise their existing water rights from well locations on private land, some wildlife species that rely on springs and/or flowing wells for water could be affected.

MONITORING AND MITIGATION MEASURES

Measures Common to Proposed Actions

Potential monitoring and mitigation measures to help avoid, reduce, or compensate for impacts to wildlife resulting from construction of the pipelines and associated facilities include:

- Schedule construction activities to avoid the nesting and brood-rearing period for birds.
- Reduce livestock grazing and trampling on revegetated pipeline corridors.
- Seed and plant sagebrush and other fire-sensitive species that have been removed or reduced by wildfire and Project implementation.

- Replace topsoil over pipeline trenches to enhance establishment of sagebrush and other native species.

- Implement best management practices to prevent delivery of sediment to drainages and wetlands along proposed pipeline routes.

Refer to **Appendix D** for a *Recommended Water Resources Monitoring and Management Plan* associated with potential impacts from groundwater pumping and lowered groundwater levels within and surrounding Honey Lake Valley, Dry Valley, and Bedell Flat.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Fish Springs Ranch Project

The Fish Springs Ranch Proposed Action would result in the irreversible and irretrievable loss of about 10 acres of wildlife habitat from construction of permanent facilities. Loss or reduction in flow from springs and associated wetlands would be for the duration of the Project, but if groundwater pumping were stopped, flow from springs and associated wildlife habitat could eventually recover to approximate pre-project levels. This recovery period is unknown, but likely would require several years depending on the total period of pumping, extent of wetland habitat loss, and whether recovery occurs naturally or is assisted through a revegetation program.

Intermountain Water Supply Project

The Intermountain Water Supply Proposed Action would result in the irreversible and irretrievable loss of less than one acre of wildlife habitat from construction of permanent above-ground facilities. Loss or reduction in flow from springs and associated wetlands would be for the duration of the Project, but if groundwater pumping were stopped, flow from springs and associated wildlife habitat could eventually recover to approximate pre-project levels after several years.

RESIDUAL EFFECTS

Effects Common to Proposed Actions

Residual effects would remain where lowered groundwater levels and/or reduced flow from springs/wells caused by production well pumping would have a permanent effect on associated wildlife habitat, unless mitigation measures would maintain habitat conditions.

ACCESS AND LAND USE

SUMMARY

Access

Implementation of the Proposed Actions would have short-term impacts to access routes in the North Valleys area ranging from minor traffic delays to increased traffic associated with transporting materials, equipment, and personnel to construction sites. Long-term increased traffic would occur along roads to and from the Stead/Lemmon Valley Area as development expands due to additional water availability.

Land Use

The Proposed Actions would result in approximately 636 acres of surface disturbance of which 367 acres would occur on public land (225 acres Fish Springs Ranch and 142 acres Intermountain Water Supply). The Fish Springs Ranch Project would disturb approximately 170 acres of private land and the Intermountain Water Supply Project 99 acres. While land ownership would remain unchanged, grazing and public use of the areas may experience short-term disruption during construction. Following reclamation, disturbed areas would be returned to previous uses. Grazing allotments or stocking rates would not be affected by the Proposed Actions. Land use would change in much of the Service Area where expanded housing and commercial development would occur as a result of increased water availability from the proposed Projects.

DIRECT AND INDIRECT IMPACTS

Impacts Common to Proposed Actions

Access

Increased traffic along Red Rock Road, Winnemucca Ranch Road, and Lemon Valley Drive would occur during construction. Intensity on specific roads would vary as construction of the proposed Projects progresses from one area to another. Crew sizes for specific tasks would vary from three to eight people and would involve up to 10 vehicle roundtrips per day. Trucks used to transport equipment and materials would likely range from three to six roundtrips per day for each Project.

Land Use

The Proposed Actions would result in approximately 636 acres of surface disturbance of which 367 acres would occur on public land (225 acres Fish Springs Ranch and 142 acres Intermountain Water Supply). While land ownership would remain unchanged, grazing and public use of the areas may experience short-term disruption during construction.

Under the Proposed Actions, active construction areas in the rights-of-way and associated facilities on public land would not be available for recreational or grazing use until construction activities are completed. Those engaged in activities that require unrestricted use of the area would need to adjust to the presence of short-term construction operations by relocating or modifying their activities in the area. Recreationists may drive farther into the area to find a suitable location for their activity or avoid that portion where construction operations are occurring. Once construction activities are completed, land use and public activities would return to pre-construction conditions.

Grazing allotments or stocking rates would not be affected by the Proposed Actions. Livestock grazing would experience short-term disruption during construction.

Service Area

Land use would change from open range in much of the Service Area to urban uses where expanded housing and commercial development would occur as a result of increased water availability from the proposed Projects.

Increased traffic would also result along roads leading to and from the Stead/Lemmon Valley Area where expanded housing and commercial development would occur as a result of water availability from the proposed Projects. Access into the Stead/Lemmon Valley is expected to increase to accommodate increased population of people and vehicles in the area.

Development in the Stead/Lemmon Valley Area would require developers to secure the necessary special use permits from Washoe County. Development plans are required to address access issues associated with specific development and as such, impacts to transportation and access in the area that could result from the implementation of the North Valleys Area Plan would be considered.

ALTERNATIVE A – CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

Common to Proposed Actions

Impacts to Access and Land Use under Alternative A would be similar to those described under the Proposed Actions. An overall reduction of 28 acres of surface disturbance would result from implementation of Alternative A; however, the reduction in surface disturbance is not expected to result in impacts to Land Use and Access different than those described for the Proposed Actions.

NO ACTION ALTERNATIVE

Common to Proposed Actions

Access

If the proposed Projects are not authorized, impacts associated with increased traffic along the access routes would not occur.

Land Use

Under the No Action Alternative, current land use in the geographic area encompassed by the North Valleys Area Plan would continue.

MONITORING AND MITIGATION MEASURES

Common to Proposed Actions

No monitoring or mitigation measures are considered for potential impacts to access and land use resulting from construction of the water transmission pipelines and associated facilities.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Common to Proposed Actions

Land affected by construction under the Proposed Action would be reclaimed. Current land use associated with the pipeline rights-of-way would not be irreversibly or irretrievably modified.

RESIDUAL ADVERSE EFFECTS

Common to Proposed Actions

No residual adverse effects on land use and access are anticipated since reclamation of disturbed surfaces would restore land to previous uses, including recreation, wildlife habitat, and grazing.

Development of the proposed Projects would not preclude access to public land during construction or operation of the wells, water transmission pipelines, and other associated facilities. Existing access routes across public land in the Projects Area would be maintained, thereby eliminating potential direct and indirect impacts to land access.

Existing land use in the Projects Area would not be affected during construction and operation of the wells and water transmission pipelines. Impacts to grazing allotments and restricted use of the disturbance areas would be short-term and confined to construction activities occurring within the respective rights-of-way. Reclamation of disturbed areas would be concurrent as construction operations progress toward completion.

RECREATION

SUMMARY

Current BLM land use policy for the Study Area allows for a variety of activities including recreation, mining, and grazing. Recreational opportunities in basins encompassed by the North Valleys Area Plan include organized events, such as motorcycle races, dog trials, cattle drives, and equestrian events. This area also provides open space for diverse recreational activities such as hiking, horseback riding, hunting, mountain biking, cross-country motorcycling, and off-highway vehicle use. BLM's Carson City Field Office manages organized events in the area included in the North Valleys Area Plan to reduce potential for user conflict; however, diverse activities are generally unrestricted as to when and where they may occur.

Under the Proposed Actions, recreational users of public land in the Projects Area would potentially be required to find other locations for specific activities and events or event staging areas if such activities conflicted with construction operations.

DIRECT AND INDIRECT IMPACTS

Impacts Common To Proposed Actions

Off-highway vehicle (OHV) enthusiasts are the largest group of dispersed recreationists using public land in the Projects Area. During construction of the proposed Projects, activities that require large areas of open space such as motorcycle races, horseback riding, dog trials, cattle drives, and "coyote chasing" may occasionally intercept active construction areas and haul routes. Individuals participating in these activities would need to alter their routes or relocate to other areas to avoid contact with construction operations. Upon completion of construction and reclamation activities, these areas would be returned to previous uses.

BLM coordinates organized events in the geographic area encompassed by the North Valleys Area Plan through a permit system. Activities that currently take place in the proposed Projects Area could be relocated to other areas. Since most organized recreational activities occur on weekends, and construction operations occur Monday through Friday, potential impacts to events would be minor considering the amount of available public land remaining in the area and relative infrequency of these events.

Hunting is not a predominant dispersed activity in the Study Area. According to Nevada Division of Wildlife, only 20 resident permits for mule deer were issued in 2003 for hunting in game management unit 021 that encompasses areas within the North Valleys Area Plan. Less than 15 permits for pronghorn have been issued annually for the past three hunting seasons in two combined game management units in the area, including unit number 021. No evidence of mule deer or pronghorn was recorded during a reconnaissance of the Projects Area during June 2004. Given the small percentage of public land potentially affected by the Proposed Actions, impacts to big game hunting are expected to be negligible both in terms of the availability of game species and remaining habitat. Statistics were not available for upland game bird hunting; however, it is expected that impacts to bird hunting would also be minimal given the large amount of available habitat remaining in the area.

Impacts to persons using the Projects Area for dispersed recreational activities such as hiking, jogging, mountain biking, and motocross/OHV would include exposure to noise from construction equipment, dust from construction activity, and visual impacts on the landscape – all of which may negatively impact the sense of solitude or sense of "openness" enjoyed during these types of activities. Users may resort to increasing driving distance to other locations in the area to avoid these impacts. However, given the amount of land in the area available for dispersed recreational activities, these types of impacts are considered minor because the Projects do not preclude these uses altogether but rather requires adaptation or relocation to other areas. In addition, the construction period associated with installation of the water transmission pipelines is a short duration activity.

Service Area

Recreation activities in the Stead/Lemmon Valley Area would change in response to development of housing, commercial buildings, and community infrastructure. Current uses including OHV, hiking, horseback riding, and other activities would likely be displaced to adjacent public land. The displacement of these activities from private development land to public land would occur over a period of time. Developers would be required to provide for open space and parks as part of the design of individual projects; these types of facilities would serve to replace some of the recreational uses that would be displaced by residential housing and commercial development.

Impacts Unique to Fish Springs Ranch Project

No unique direct or indirect impacts to Recreation associated with the Fish Springs Ranch Project have been identified.

Impacts Unique to Intermountain Water Supply Project

No unique direct or indirect impacts to Recreation associated with the Intermountain Water Supply Project have been identified.

ALTERNATIVE A – CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

Impacts to recreation opportunities under Alternative A would be similar to those described under the Proposed Actions.

NO ACTION ALTERNATIVE

Common to Proposed Actions

Under the No Action Alternative, recreation in the Projects Area would continue as it presently exists.

MONITORING AND MITIGATION MEASURES

Measures Common to Proposed Actions

BLM would provide 30 days prior notice to Fish Springs Ranch and Intermountain Water Supply for all permitted recreational events that would occur in the vicinity of the Projects Area. This may require a temporary modification of the respective work schedules to accommodate events.

No other monitoring and mitigation measures beyond those described in the "*Proposed Actions*" section of Chapter 2 have been identified to reduce impacts to Recreation.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Common to Proposed Actions

The Proposed Actions would not irreversibly or irretrievably affect recreation resources. Following reclamation, the rights-of-way would blend with surrounding topography and habitat and most recreational uses in the vicinity of the pipeline rights-of-way would resume.

RESIDUAL EFFECTS

Fish Springs Ranch Project

Residual effects would include electrical substation, pump station, storage tanks, and wellhead structures in Honey Lake Valley where recreational activities for the public are restricted under current ranch operations. Visual impacts associated with above-ground structures of the respective Proposed Actions are addressed in the *Visual Resources* section of this chapter.

Intermountain Water Supply Project

Residual effects would include wellhead structures in Dry Valley and Bedell Flat, and pump station and storage tanks in Bedell Flat where recreational access would be restricted by fencing or other means to protect these facilities. Visual impacts associated with above-ground structures of the respective Proposed Actions are addressed in the "*Visual Resources*" section of this chapter.

NOISE

SUMMARY

Major sources of noise associated with the Proposed Actions would be from construction related equipment and is predicted to be less than the maximum allowed by Washoe County Code. Noise generated by increased truck traffic transporting materials and equipment would increase along access routes to the Projects Area but would be of short duration. Construction noise levels would be short-term, brief, and intermittent. Long-term noise levels associated with wellhead, pump station, and pipeline operations would generally be steady and continuous, and predicted to be at lower levels than construction noise.

DIRECT AND INDIRECT IMPACTS

Impacts Common to Proposed Actions

Noise generated by the Proposed Actions would vary during pipeline construction and operation. The Study Area is rural with scattered residences and some wildlife species. The Washoe County Development Code was used to evaluate Project noise levels on humans, which regulates the maximum noise level at the nearest residential and public use facilities at L_{dn} 65 dBA (Washoe County 1996). The EPA L_{dn} 55 dBA guideline (EPA 1979) was used to evaluate Project noise levels on wildlife.

Equipment used during construction activities would include drill rigs and standard construction and earth moving equipment (e.g., scrapers, backhoes, graders, trenchers, and bulldozers). Each piece of equipment can typically generate intermittent noise levels up to 90 dBA at a distance of 50 feet from the equipment (DOT 1995). However, equipment noise can vary considerably depending on age, condition, manufacturer, use during a time period, and a changing distance from the equipment to a listener location.

Short-term noise levels during construction of the proposed Fish Springs Ranch and Intermountain Water Supply projects are predicted to not exceed Washoe County requirements of L_{dn} 65 dBA at approximately 445 feet and EPA guideline of L_{dn} 55 dBA at approximately 1,335 feet from construction equipment used on the Projects.

If blasting becomes necessary during the course of construction of either the Fish Springs Ranch or Intermountain Water Supply projects, noise generated is predicted to meet the peak 122 dBC level human annoyance guideline of the U.S. Army at approximately 1,000 feet from the point of detonation, but may be audible within a 5-mile radius. Possible locations where blasting may be necessary have not been identified, and if it does occur, the blast noise would be essentially instantaneous, and not likely occur on a regular basis.

Although EPA and U.S. Army noise level guidelines are associated with human response to noise, it is difficult to accurately predict long-term effects of noise on wildlife. Wildlife response to noise is a function of many variables including characteristics of the noise, duration, life history characteristics of the species, habitat type, season, current activity of the animal, sex, age, previous noise exposure, and other physical stressors such as drought (Bommer and Bruce 1996). General wildlife responses to noise are summarized in the following list (Bommer and Bruce 1996; EPA 1971):

- Most animals habituate to sounds disassociated with other threatening stimuli.
- Steady sounds are less prone to startle animals than sounds with fast rise times.
- Sight and actions of noise sources can cause greater impact than the noise itself.
- Noise that causes species to avoid critical-use areas can adversely affect the populations.
- Animals can be more sensitive to noise in certain locations and at certain times of year.
- Herding or flocking animals are often as sensitive as the most sensitive individual in the group.
- Different species and individual animals within a species have different levels of noise tolerance and habituation.
- Behavioral and physiological responses to noise have the potential to cause injury, energy loss, decreases in food intake, habitat avoidance, habitat abandonment, and reproductive losses.
- Animals that rely on auditory systems for courtship, mating, prey location, predator detection, and homing would be more threatened by increased noise levels due to man-made sources than species that primarily use other senses in a natural setting.

Loss of habitat and increased noise levels associated with the Proposed Actions may displace some animals and cause them to relocate an unknown distance. However, most animals would become habituated to long-term noise associated with water transmission facilities and resume use of habitat.

Service Area

Development of housing, commercial structures, and community infrastructure needed to support the population of people in the Stead/Lemmon Valley Area as a result of the proposed Projects would increase noise levels in the area. Construction activity followed by occupation of houses and commercial activity would create noise that would exceed ambient noise levels. Washoe County would enforce noise codes as they pertain to any development within the Service Area.

Impacts Unique to Fish Springs Ranch Project

Construction and operation of an electrical substation to provide power to well field pumps and pump station for the Fish Springs Ranch Project would eliminate impacts of noise as compared to diesel generators. For production wells operating on electric power from distribution lines, Washoe County L_{dn} 65 dBA and EPA L_{dn} 55 dBA guidelines would be met at a radius of 100 feet and 645 feet, respectively.

Impacts Unique to Intermountain Water Supply Project

Long-term noise levels associated with the Intermountain Water Supply Project are predicted to meet Washoe County L_{dn} 65 dBA requirement at a 100-foot radius around the pump station and production wells operating on electrical power from distribution lines, and L_{dn} 65 dBA at 1,000 feet and EPA L_{dn} 55 dBA at 2,670 feet using diesel generators. For the two production wells operating on electric power from distribution lines, Washoe County L_{dn} 65 dBA and EPA L_{dn} 55 dBA guidelines would be met at a radius of 100 feet and 645 feet, respectively.

ALTERNATIVE A – CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

Under Alternative A, predicted construction and operational noise would be the same as for the Proposed Actions.

NO ACTION ALTERNATIVE

Common to Proposed Actions

Under the No Action Alternative, impacts from noise would not increase beyond current levels.

MONITORING AND MITIGATION MEASURES

Measures Common to Proposed Actions

The following mitigation measures could be implemented to reduce or eliminate effects of noise on humans and wildlife:

- Limit high-noise and blasting activities to daytime hours.

- Install high-grade mufflers on diesel-powered equipment and generators (Intermountain Water Supply Project only).

- Combine noisy operations to occur for short durations during the same time period.

- Minimize or eliminate night time construction and operation activities.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Common to Proposed Actions

No resources would be irreversibly or irretrievably impacted by noise generated from the proposed Projects.

RESIDUAL EFFECTS

Effects Common to Proposed Actions

No residual effects on the environment from noise generated during the course of construction and operation of the proposed Projects have been identified. Noise levels associated with development of housing and commercial buildings and subsequent use of these facilities would be regulated by Washoe County.

VISUAL RESOURCES

SUMMARY

Color and texture of reclaimed areas would result in minimal contrast to the existing landscape. Disturbed areas associated with construction activity would contrast with undisturbed areas during periods of construction. Mitigation would include shaping edges and revegetation of disturbed areas to blend with natural occurring land forms and vegetation. After completion of mitigating measures, VRM Class IV objectives would be met.

New structures associated with pump stations and storage tanks would introduce moderate visual impacts of geometric shapes into a landscape of rolling hills.

DIRECT AND INDIRECT IMPACTS

Impacts Common to Proposed Actions

New structures associated with pump stations and storage tanks would introduce moderate visual impacts of geometric shapes into a landscape of rolling hills. Installation of proposed water transmission pipelines would have a temporary visual impact while under construction.

Color and texture of reclaimed areas would result in minimal contrast to the existing landscape. Disturbed areas associated with construction activity would contrast with undisturbed areas during periods of construction. Reclamation of disturbed areas would include shaping edges and revegetation to blend with natural occurring land forms and vegetation. After completion of reclamation measures, VRM Class IV objectives would be met.

Service Area

BLM's VRM Classification system is not applicable to private land that could be affected by the proposed Projects. For purposes of disclosing indirect effects to private land, the following information is provided.

Development in the Stead/Lemmon Valley Area would result in changes in form, line, color, and texture compared to the natural open range landscape. Existing housing and buildings in the area have modified landscapes and viewsheds from natural conditions. Additional development that would occur in response to the proposed Projects would add several buildings, streets, outdoor lighting, and human activity that would modify existing landscape. Depending on the specific observation point, development may or may not affect selected views.

Impacts Unique to Fish Springs Ranch Project

The proposed Fish Springs Ranch water transmission pipeline would have a temporary visual impact while under construction. In southeastern Honey Lake Valley, an electrical substation, overhead electrical powerlines, pump station, and storage tanks would result in a moderate visual impact (see key observation point (KOP-1) on **Figure 4-4**). The proposed terminal water storage tank at the end of the Fish Springs Ranch pipeline would be located adjacent to Matterhorn Boulevard near the drainage divide between Antelope Valley and Lemmon Valley (see KOP-2 on **Figure 4-4**). KOP-2 would have the highest number of potential viewing minutes between the two KOPs; however, the view would be relatively short duration because viewers would be associated with traffic going over the divide.

Impacts Unique to Intermountain Water Supply Project

The proposed Intermountain Water Supply pipeline would have a temporary visual impact while under construction. Production wells, pump station, and storage tanks in Dry Valley and Bedell Flat would have a moderate visual impact (see KOP-3 in Bedell Flat on **Figure 4-5**). A terminal water storage tank is not included in the Proposed Action for Intermountain Water Supply.

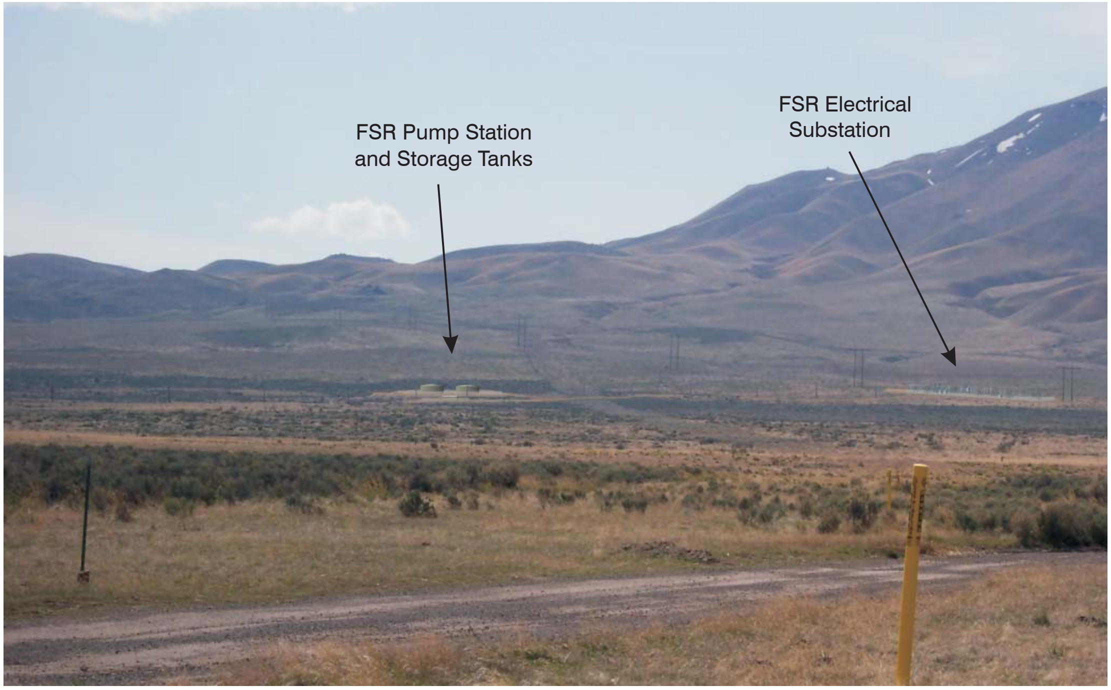
ALTERNATIVE A – CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

Implementation of Alternative A would would result in minimal reduction in visual impacts associated with installation of water transmission pipelines as compared to the Proposed Actions. Temporary visual impacts associated with pipeline construction would be reduced slightly for Alternative A because the disturbance area would be less than for the Proposed Actions.

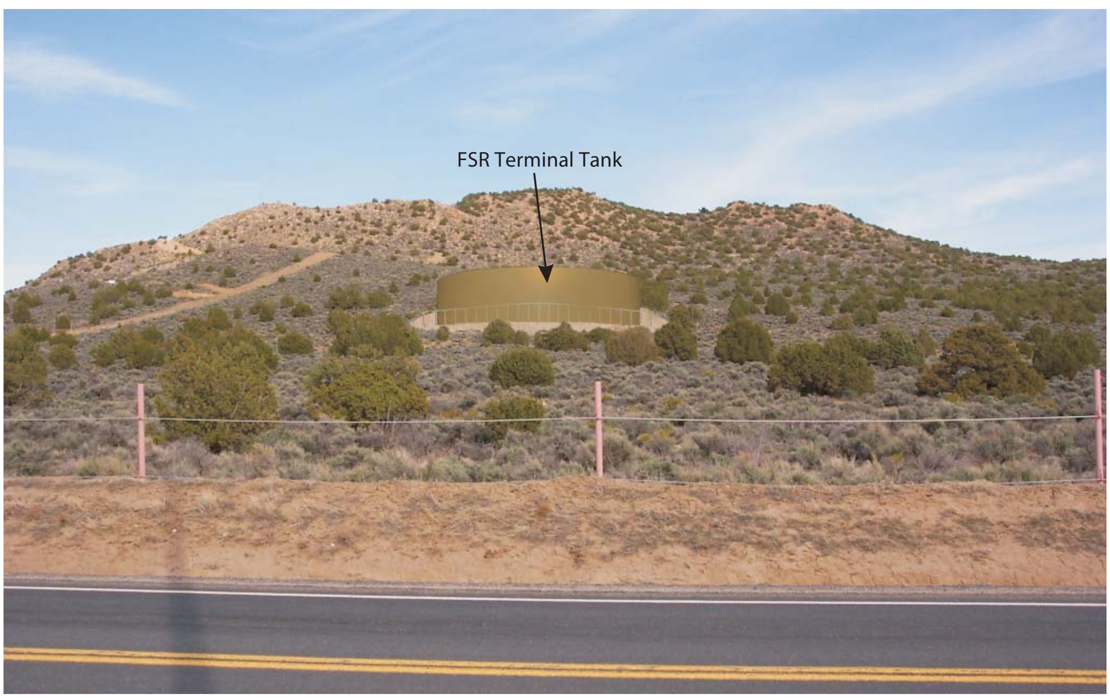
NO ACTION ALTERNATIVE

Common to Proposed Actions

Under the No Action Alternative, no visual impacts would occur beyond those already present in southeastern Honey Lake Valley, Dry Valley, Bedell Flat, Antelope Valley, and Lemmon Valley.



KOP-1 View from Fish Springs Ranch Road looking south.

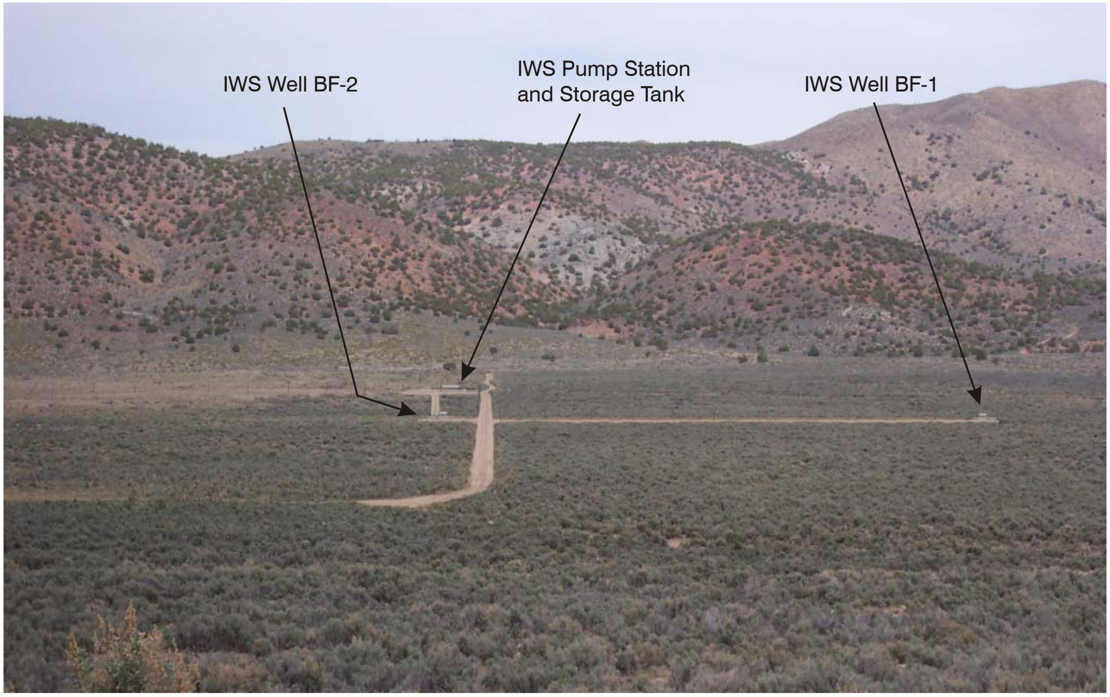


KOP-2 View from highest point on Matterhorn Boulevard looking east.

See Figure 3-8 for location of Key Observation Points (KOPs).

FSR = Fish Springs Ranch

KOPs 1 and 2
North Valleys Rights-of-Way Projects EIS
Reno, Nevada
FIGURE 4-4



KOP-3 View from Bedell Flat Road looking east across valley.

MONITORING AND MITIGATION MEASURES

Measures Common to Proposed Actions

Mitigation measures have been developed to minimize visual impacts. The objective is to reduce visual contrasts based on three concepts: (1) siting facilities in less visible areas; (2) minimizing disturbance; and (3) repeating basic elements of form, line, color, and texture. The following measures would be applied to minimize visual impacts of the Proposed Actions:

- Establish clearly defined construction limits that incorporate irregular shapes to reflect existing forms and patterns.
- Plan revegetation so colors and textures blend with undisturbed land.
- Minimize visual contrast of structures with natural forms by using colors that blend with the land; use finishes that have low levels of reflectivity.
- Paint structures a slightly darker color than the surrounding landscape to compensate for the effects of shade and shadow.
- Preserve undeveloped character of the landscape.
- Investigate other terminal tank sites that would be less visible.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Common to Proposed Actions

No irreversible or irretrievable commitment of visual resources has been identified as a result of implementation of the Proposed Actions.

RESIDUAL EFFECTS

Fish Springs Ranch Project

Following successful reclamation along the water transmission pipeline corridors, the proposed Fish Springs Ranch terminal water storage tank would be the most noticeable residual effect of the Proposed Action. Pump stations and wellheads would also have smaller residual effect on visual resources. Weak contrasts in form, line and color could remain assuming these structures would not be removed. Implementation of mitigation measures would further reduce visual impacts from these facilities.

Intermountain Water Supply Project

Residual effects of the pump station, storage tanks, and wellhead structures in Dry Valley and Bedell Flat would be the most noticeable residual effect of the Proposed Action. Weak contrasts in form, line and color could remain assuming these structures would not be removed. Implementation of mitigation measures would further reduce visual impacts from these facilities.

SOCIAL AND ECONOMIC RESOURCES

SUMMARY

The Proposed Actions would potentially affect social and economic resources by increasing the level of economic activity in Washoe County during construction of the Projects. These potential effects are expected to be beneficial because the Proposed Actions would increase spending and income levels in the area by providing jobs. The Proposed Actions would deliver water to the Stead/Lemmon Valley Area, thereby allowing development of approved land uses which have not been allowed to develop because of the lack of a municipal water supply.

DIRECT AND INDIRECT IMPACTS

Impacts Common to Proposed Actions

The Proposed Actions would increase economic activity within Washoe County during the construction periods. Construction workforces would be comprised of skilled laborers, such as carpenters, brick layers, millwrights, iron workers, sheet metal workers, painters, electricians, and plumbers/pipe layers.

Construction jobs would be filled by workers already residing in the area and by workers from outside Washoe County who would fill new jobs. Even if all 220 workers (combined construction work force estimated for both Projects) relocated to Washoe County from somewhere else, Washoe County has the community infrastructure to accommodate them without any socioeconomic impacts. In 2000, over 900 rental units were vacant and available to house construction workers. Construction of the proposed Projects would result in temporary jobs for up to one year and is not expected to result in a permanent increase in the population, employment, or spending within the area. Effects on the workforce would be minimal; therefore, overall project-induced direct and indirect effects on the Washoe County economy are also expected to be minimal and beneficial.

Nevada does not tax personal income in-state; however, construction supplies and materials would be taxed at 7.375 percent with 2.5 percent going to the county general fund and another 0.625 percent going to special county projects. The remainder of the revenue would go to local school districts or would stay in the state general fund. Privately owned pipeline and ancillary facilities would be subject to county property tax at an average rate in the unincorporated area of Washoe County of $3.17 per $100 of assessed valuation on the leasehold interest.

The Proposed Actions would have no direct impact on growth in Washoe County, with the exception of requiring local government to review and decide on developments and master plan amendments made possible by the provision of a water supply.

Service Area

Potential indirect impacts could result from development of areas with residential, commercial, and industrial land uses in the Stead/Lemmon Valley Area that have not been developed because of lack of water. In addition, Project proponents would have to obtain special use permits from Washoe County for the pipeline(s) and pumping station(s) after this EIS is complete and before a Record of Decision (ROD) is issued (Whitney 2005).

The Proposed Actions are responding to the existing and future water needs of the Stead/Lemmon Valleys Area. These needs are based on land use plans and designations prepared by the Washoe County Department of Community Development, which depict the planned growth.

Based on the North Valleys Area Plan land use designations (Washoe County Department of Community Development 2004), ultimate build-out potential of existing vacant parcels in the Plan area is approximately 23,200 houses, which could entail an additional population of 66,700 at the population per household (PPH) of 3.02 persons and an occupancy rate of 95.2 percent, (average PPH and occupancy rates found in Census Tracts 26.03 – 26.06, the main tracks in the North Valleys Area Plan) (Giesinger 2004). No time frame has been identified for ultimate build-out; Washoe County adopted a policy that requires adequate water rights as a condition of approval of any subdivision in the planning area (Washoe County Department of Community Development 2004). All groundwater in the area encompassed by the North Valleys Area Plan is currently appropriated.

If both Proposed Projects move forward, 10,500 af/yr of water would be delivered to the Stead/Lemmon Valley Area, providing water for approximately 43,750 people (based on 0.24 af/yr) or approximately 13,760 dwelling units (given the PPH and vacancy rate assumed above), well below the number of people/houses ultimately possible based on land use designation alone.

The Reno-Stead Airport Master Development Plan projects an ultimate water need of approximately 3,000 af/yr to achieve current development plans including domestic and landscaping requirements. Purveyors would determine which customers (residential or industrial) are able to obtain the water necessary to fulfill planned developments.

Although growth would increase the demand on infrastructure and community services in the Stead/Lemmon Valley area, it is not possible to estimate a population/service threshold. The area is currently held in lots of various acreages with various land use designations. Impacts that may arise from growth made possible by delivery of water via the Proposed Actions would be addressed by local government units in the subdivision review and approval process, determined in part by the size and density of each subdivision and the planned needs of utility and service providers. One subdivision may be developed into 5-acre lots in which public utilities would be cost prohibitive because of the distance between residences. Others may be developed as planned unit developments, which by clustering the houses could easily provide urban type densities and services. And others, those adjacent to the City of

Reno, may annex to the city and receive services from the existing municipal districts. Primary governmental services include the following:

Water Service

The North Valleys Area Plan identifies a residential water demand of 250 gal/day/person as a quality of life indicator but uses 210 gal/day/person (0.24 af/yr) for planning purposes (Washoe County Department of Community Development 2004).

Sanitary Sewer Service

Development within the Reno-Stead Corridor Joint Planning area would require expansion of existing wastewater treatment facilities. Residential development in the area must meet County standards requiring a sanitary sewage system capable of handling a minimum of 325 gal/day/dwelling unit (Washoe County Department of Community Development 2004). Sanitary sewer service can be provided by the City of Reno or in small systems approved and operated by the Nevada Public Utility Commission.

Fire Protection

Current fire protection facilities should be adequate to support anticipated growth in the area (Washoe County Department of Community Development 2004).

Police Protection

As development occurs in the Stead/Lemmon Valley Area, Sheriff patrols would need to be increased (Washoe County Department of Community Development 2004).

Schools

New schools would be needed as development occurs. The service standard for schools in the Stead/Lemmon Valley Area requires that schools be located within a maximum 15-minute one-way travel time for elementary school students, a maximum 25-minute one-way travel for middle school students, and a maximum 35-minute one-way travel time for high school students (Washoe County Department of Community Development 2004).

Parks and Recreation Facilities

Washoe County park standards require 7 acres per 1,000 population. As new residential development occurs, land and/or money to develop parks would be set aside for that area (Washoe County Department of Community Development 2004).

The value of existing homes in the Stead/Lemmon Valley Area would likely increase with availability to municipal water lines from increased water supply. Long-term housing values would increase because of increased reliability associated with the new water source and delivery system. Land which is currently vacant but developable would increase in value depending on development potential of the land, (i.e., the number of new units allowed by zoning and development standards already in place). Assessing actual property value increase or decrease, if any, would require a formal appraisal or property value study. Property tax revenues from increased home values and new residential and related commercial development would increase as a result of the Proposed Actions.

Impacts Unique to Fish Springs Ranch Project

Approximately 160 workers would be required to construct the Fish Springs Ranch proposed pipeline and associated structures. Construction of the pipeline would require approximately 11 months to complete (ECO:LOGIC 2004). Construction work force associated with the Fish Springs Ranch Project would represent an increase of 1 percent over the 17,607 workers in Washoe County construction work force in 2000.

Implementation of the Ranch Conversion Plan for Fish Springs Ranch (see Chapter 2) may reduce the current work force at the ranch; however, the ranch currently employs only five personnel. Ranch conversion from irrigated hay and alfalfa production would not result in a meaningful displacement of agricultural workers in eastern Honey Lake Valley.

Construction costs for the Fish Springs Ranch Project is estimated at $55 million (in 2004 dollars), which includes labor, materials, and services associated with construction of wells and well buildings, pump station, pipelines, tanks, and an electrical substation.

Up to 8,000 acre-feet of water would be supplied annually through the Fish Springs Ranch Proposed Action. Based on the per capita use described above (0.24 af/person/year), the Fish Springs Ranch Project would supply water for approximately 33,300 people if all the water was used for residential purposes.

Impacts Unique to Intermountain Water Supply Project

Approximately 60 workers would be employed during construction of the Intermountain Water Supply Project. Construction and development are estimated to require approximately 10 to 12 months to complete. The construction work force for water transmission pipeline and ancillary facilities associated with the Intermountain Water Supply Project would represent a 0.2 percent increase over the 17,607 workers in Washoe County construction work force in 2000. Construction cost for the Intermountain Water Supply Project is estimated at $11.5 million (in 2005 dollars).

The Intermountain Water Supply Project would provide 2,500 acre-feet of water annually. Based on the per capita use described above (0.24 af/person/year), the Intermountain Water Supply Project could supply water for approximately 10,400 people if all water was used for residential purposes.

ALTERNATIVE A - CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

Alternative A would involve Fish Springs Ranch and Intermountain Water Supply using a common 130-foot wide construction right-of-way for the respective pipelines. Potential impacts on social and economic resources, including growth and property values, are expected to be similar to impacts described under the Proposed Actions.

NO ACTION ALTERNATIVE

Common to Proposed Actions

Under the No Action Alternative, beneficial effects on the economy would not occur. Development potential identified in the Stead/Lemmon Valley Area would not occur unless an alternate source of water was secured or Washoe County's policy requiring an adequate water supply from other sources was changed. Existing home values may increase faster than other areas of the county if the area becomes "exclusive" because other development, potentially at higher densities, is not allowed. At present, vacant and developable land has little real value because the lack of water prevents them from being developed.

No Action for Fish Springs Ranch Project

In addition to the loss of construction labor revenue and expenditure of money to purchase materials for use in developing the proposed Project, implementation of the No Action Alternative would eliminate transport of approximately 8,000 af/yr of water via pipeline across public land to the Stead/Lemmon Valley Area. Groundwater withdrawals at Fish Springs Ranch, however, may continue for irrigation or other purposes in eastern Honey Lake Valley. Employment levels at the Fish Springs Ranch would likely continue at present levels.

No Action for Intermountain Water Supply Project

In addition to loss of construction labor revenue and expenditure of money to purchase materials for use in developing the proposed Project, implementation of the No Action Alternative would eliminate transport of approximately 2,500 af/yr of water via pipeline across public land to the Stead/Lemmon Valley Area.

MONITORING AND MITIGATION MEASURES

Measures Common to Proposed Actions

No mitigation or monitoring measures have been identified by BLM to reduce impacts to social and economic resources associated with the Proposed Actions.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Common to Proposed Actions

No irreversible and irretrievable commitment of social and economic resources has been identified associated with the Proposed Actions and Alternatives.

RESIDUAL EFFECTS

Effects Common to Proposed Actions

No residual impacts to social and economic resources have been identified as a result of the Proposed Actions and Alternatives.

CULTURAL RESOURCES

SUMMARY

Two National Register eligible properties are present in areas common to the Proposed Actions. Both properties were treated during the Tuscarora Pipeline Project and no further action would be required at these properties in advance of either Proposed Action. Previously unevaluated sites are not present in the Area of Potential Effect (APE) common to both Proposed Actions.

Six National Register eligible properties are located within the APE unique to the Fish Springs Ranch Proposed Action. These sites have been recommended as eligible based on Criterion D. Treatment of the sites was limited to selected features or loci within the immediate Tuscarora Project right-of-way. Additional data recovery may be required at these properties in advance of the Fish Springs Ranch Proposed Action. Six sites located within portions of the APE unique to the Fish Springs Ranch Proposed Action and three sites located adjacent to the APE remain unevaluated or contain an unevaluated component. These sites would require additional review to determine eligibility for the National Register.

Two National Register eligible properties (based on Criterion D) are located within the APE unique to the Intermountain Water Supply Proposed Action. Four sites located within portions of the APE unique to the Intermountain Water Supply Proposed Action and four sites located adjacent to the APE remain unevaluated or contain an unevaluated component. These sites would require additional review to determine eligibility for the National Register.

DIRECT AND INDIRECT IMPACTS

Area of Potential Effect

Compliance with Section 106 of the National Historic Preservation Act requires definition of an area of potential effect (APE) specific to the proposed undertaking. Direct effects that would result in physical damage to properties and effects that might result in a diminished integrity of setting for properties located outside the area of direct effect were also considered.

Areas of direct effect would be associated with production well development, construction of pump stations, storage tanks and associated components. The inventory of APE associated with linear project elements was defined as a corridor extending 150 feet to either side of the staked centerline. The APE associated with point or location specific elements was defined as an area extending 100 feet beyond the defined construction limits. The APE for Fish Springs Ranch and Intermountain Water Supply Proposed Actions includes a 300-foot wide corridor tied to the centerline of proposed respective pipelines, and areas around point or location-specific elements that make up part of the Proposed Actions.

Some eligible properties located outside areas of direct effect may be subject to impact even though no surface disturbance is proposed. Properties deemed eligible based on National Register Criteria A through C may be affected due to introduction of new visual or audible elements. An archival Study Area extending 1 mile from the centerline of each Proposed Action was established to assess the potential for such effects. Previously identified National Register eligible properties located in those archival study areas were reviewed to determine if any would be subject to impacts that may affect their eligibility based on National Register Criteria A through C.

Impacts Common to Proposed Actions

Two National Register eligible properties (CrNV-31-4784 and -4789) are present in areas common to the Proposed Actions. Both sites have been recommended as eligible based on Criterion D. These properties were treated during the Tuscarora Pipeline Project and no further action would be required at these properties in advance of either Proposed Action. Previously unevaluated sites are not present in that portion of the APE common to both Proposed Actions. Based on these considerations, impacts to previously untreated National Register eligible properties would not occur within the APE common to both Proposed Actions.

Impacts Unique to Fish Springs Ranch Project

Six National Register eligible properties are located within the APE unique to the Fish Springs Ranch Project. They include CrNV-31-1775a, -4768, -4782, -4785 (historic and prehistoric components), -4798, -6026 (prehistoric component only), and –6027. These sites have been recommended as eligible based on Criterion D.

Three of the National Register eligible properties were subjected to some level of data recovery during the Tuscarora Pipeline Project. One property (CrNV-31- 4768) was treated and no further action would be needed at that property in advance of the Fish Springs Ranch Proposed Action. Only a portion of properties CrNV-31-4782 and -4785 (historic and prehistoric components) has been treated. Treatment was limited to selected features or loci within the immediate Tuscarora Project right-of-way. Additional data recovery may be required at these properties in advance of the Fish Springs Ranch Proposed Action.

National Register eligible portions of CrNV-31-1775a were avoided during construction of the Tuscarora Pipeline Project. Measures should be taken to ensure that contributing features and loci not previously treated are avoided and protected during construction of the North Valleys Rights-of-Way Project. If contributing features and/or loci cannot be avoided and protected, then an appropriate level of treatment should occur prior to Project construction.

Six sites (CrNV-31-5082, -5088, -6028, -6029, -6050, and -6051) located within portions of the APE unique to the Fish Springs Ranch Proposed Action remain unevaluated or contain an unevaluated component. These sites require additional review to determine eligibility for the National Register. An assessment of potential Project impacts to these sites cannot occur until National Register eligibility has been determined.

Eligibility of nine National Register sites located outside of, but within, one mile of Fish Springs Ranch Proposed Action APE is listed as undetermined. Of these, six are prehistoric period sites. If eligible, their significance most likely would be related to their potential to yield important information (Criterion D). As such, they would not be subject to potential impacts associated with the introduction of new visual or audible elements. The remaining three sites (CrNV-31-1661, -4554, and -4590) date to the historic period. One or more of these sites may be National Register eligible based on Criteria A through C. As a result, they may be subject to potential impacts associated with the introduction of new visual or audible elements. The National Register eligibility of these three sites must be determined before an assessment of potential Project impacts can occur.

Impacts Unique to Intermountain Water Supply Project

Two National Register eligible properties (CrNV-31-6039 and -6040 prehistoric components only) are located within the APE unique to the Intermountain Water Supply Proposed Action. These sites have been recommended as eligible based on Criterion D.

Four sites (CrNV-31-5781, -6032, -6033, -6036 [prehistoric component only]) located within portions of the APE unique to the Intermountain Water Supply Proposed Action remain unevaluated or contain an unevaluated component. These sites require additional review to determine eligibility for the National Register. An assessment of potential Project impacts to these sites cannot occur until National Register eligibility has been determined.

The National Register eligibility of five sites located outside of, but within, one mile of the Intermountain Water Supply Proposed Action APE is listed as undetermined. Of these, one is a prehistoric period site. If eligible, significance would most likely relate to its potential to yield important information (Criterion D). As such, the site would not be subject to potential impacts associated with the introduction of new visual or audible elements. The remaining four sites (CrNV-31-1664, -1752, -4683, and -4687) date to the historic period or contain a component that dates to the historic period. One or more of these sites may be National Register eligible based on Criteria A through C. As a result, they may be subject to potential impacts associated with the introduction of new visual or audible elements. The National Register eligibility of these sites must be determined before an assessment of potential Project impacts can occur.

Service Area

An unknown number and type of cultural sites may be located within the Stead/Lemmon Valley Area where development could occur as a result of delivery of water to the Projects terminuses. Washoe County requires that prior to construction, an archaeological inventory be completed for areas scheduled for development.

ALTERNATIVE A – CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

Impacts associated with Alternative A would be similar in nature and extent as those described for the Proposed Actions.

NO ACTION ALTERNATIVE

Common to Proposed Actions

There would be no direct effect on National Register eligible sites for either Proposed Action under the No Action Alternative.

MONITORING AND MITIGATION MEASURES

Measures Common to Proposed Actions

Impacts to previously untreated National Register eligible properties would not occur within the APE common to both Proposed Actions. Monitoring and mitigation measures would not be required in this area.

Measures Unique to Fish Springs Ranch Project

Direct and indirect impacts could occur to National Register eligible properties. The following mitigation measures are proposed to address impacts specific to the Fish Springs Ranch Proposed Action:

- **Encourage avoidance:** The Project proponent, in concert with BLM, shall make a reasonable effort to design the Project in such a manner as to avoid National Register eligible properties.

- **Address impacts to National Register properties located inside the APE:** Unless otherwise authorized by BLM no surface disturbance shall occur within or immediately adjacent (within 100 meters) to the boundary of National Register eligible properties CrNV-31-4798, -6026 (prehistoric component only), and -6027 prior to completion of the field phase of a data recovery plan that has been reviewed and approved by BLM in consultation with the Nevada State Historic Preservation Office.

- **Address the need for additional treatment at selected sites inside the APE:** Unless otherwise authorized by BLM no surface disturbance shall occur within or immediately adjacent (within 100 meters) to the boundary of National Register eligible properties CrNV-31-1775a, -4782 and -4785 prior to making a determination on whether additional treatment is required beyond that conducted on behalf of the Tuscarora Pipeline Project. If additional treatment is deemed necessary at one or both of the properties, no surface disturbance shall occur within or immediately adjacent (within 100 meters) to the boundary of the property prior to completion of the field phase of a data recovery plan that has been reviewed and approved by BLM in consultation with the Nevada State Historic Preservation Office.

- **Address the eligibility of unevaluated sites inside the APE:** Unless otherwise authorized by BLM no surface disturbance shall occur within or immediately adjacent (within 100 meters) to the boundary of sites CrNV-31-5082, -5088, -6028, -6029, -6050, and -6051 until their National Register eligibility has been determined. If one or more of these sites are determined to be National Register eligible no surface disturbance shall occur within or immediately adjacent (within 100 feet) to the boundary of sites prior to completion of the field phase of a data recovery plan that has been reviewed and approved by BLM in consultation with the Nevada State Historic Preservation Office.

- **Address the eligibility of unevaluated sites adjacent to the APE:** BLM would authorize work at sites CrNV-31-1661, -4554, and -4590 to determine National Register eligibility. If one or more of these sites are determined National Register eligible based on Criterion A, B, or C, then a data recovery plan shall be implemented that has been reviewed and approved by BLM in consultation with the Nevada State Historic Preservation Office.

Measures Unique to Intermountain Water Supply Project

Direct and indirect impacts could occur to National Register eligible properties. The following mitigation measures are proposed to address those impacts specific to the Intermountain Water Supply Proposed Action:

- **Encourage avoidance:** The Project proponent, in concert with BLM, shall make a reasonable effort to design the Project in such a manner as to avoid National Register eligible properties.

- **Address impacts to National Register properties located inside the APE:** Unless otherwise authorized by BLM no surface disturbance shall occur within or immediately adjacent (within 100 feet) to the boundary of National Register eligible properties CrNV-31-6039 and –6040 (prehistoric component only) prior to completion of the field phase of a data recovery plan that has been reviewed and approved by BLM in consultation with the Nevada State Historic Preservation Office.

- **Address the eligibility of unevaluated sites inside the APE:** Unless otherwise authorized by BLM no surface disturbance shall occur within or immediately adjacent (within 100 feet) to the boundary of sites CrNV-31-5781, -6032, -6033, and -6036 (prehistoric component only) until their National Register eligibility has been determined. If one or more of these sites are determined eligible for the National Register no surface disturbance shall occur within or immediately adjacent (within 100 feet) to the boundary of sites prior to completion of the field phase of a data recovery plan that has been reviewed and approved by BLM in consultation with the Nevada State Historic Preservation Office.

- **Address the eligibility of unevaluated sites adjacent to the APE:** BLM would authorize work at sites CrNV-31-1664, -1752, 4683, and -4687 (historic component only) to determine eligibility for the National Register. If one or more of these sites are determined to be National Register eligible based on Criterion A, B, or C, then a data recovery plan shall be implemented that has been reviewed and approved by BLM in consultation with the Nevada State Historic Preservation Office.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Common to Proposed Actions

The Proposed Actions and other action Alternatives would result in loss of cultural resources that are not National Register eligible. Loss of these sites would constitute an irreversible and an irretrievable commitment of a resource. These sites have been recorded to current BLM standards and site information integrated into agency and statewide data repositories.

Impacts to National Register eligible properties would be reduced through preparation and implementation of data recovery plans. However, the information potential of impacted National Register eligible properties cannot be fully retrieved. As a result, post-treatment impacts to these properties as a result of the Proposed Actions would result in an irreversible and irretrievable commitment of a resource.

RESIDUAL EFFECTS

Effects Common to Proposed Actions

Data recovery activities could occur at National Register eligible properties. Even after implementation of data recovery activities, non-renewable resources would have been expended and is a residual effect of the Proposed Actions.

NATIVE AMERICAN RELIGIOUS CONCERNS/INDIAN TRUST RESPONSIBILITIES

SUMMARY

The Native American consultation process remains ongoing at this time. To date, concerns have not been identified for Native American traditional or religious uses of areas within the Fish Springs Ranch and Intermountain Water Supply proposed Projects. Based on preliminary findings, the Proposed Actions would have no direct or indirect impact on traditional or religious values located within the common areas, or areas unique to the respective Proposed Actions. The ongoing consultation process may result in identification of Native American Religious Concerns/Indian Trust Responsibilities, which will be reviewed and considered during preparation of the Records of Decision (ROD).

DIRECT AND INDIRECT IMPACTS

Impacts Common to Proposed Actions

The Native American consultation process remains ongoing at this time. To date, neither Native American tribal groups nor individual Native Americans have expressed a concern regarding traditional or religious uses of areas common to the Fish Springs Ranch and Intermountain Water Supply proposed Projects. Based on these preliminary findings, the Proposed Actions would not appear to have a direct or indirect impact on traditional or religious values located within the common areas, areas unique to the respective Proposed Actions, tribal trust resources, trust assets, or tribal health and safety.

Some springs in the Study Area could be considered sacred sites by tribal members. Consultation is ongoing between BLM and the tribes. The ongoing consultation process may result in identification of Native American Religious Concerns/ Indian Trust Responsibilities, which will be reviewed and considered during preparation of the Records of Decision (ROD).

BLM has reviewed the Proposed Actions as they relate to potential impacts to Pyramid Lake Reservation water resources (see "*Water Resources"* section of Chapter 4). BLM has recommended monitoring measures and management prescriptions that could be implemented in the event that impacts to Reservation water resources are greater than predicted (see **Appendix D**).

Service Area

Development of the Stead/Lemmon Valley Area as a consequence of delivery of water via the proposed Projects would have an undetermined effect on Native American Religious Concerns. BLM's Indian Trust Responsibilities would not be affected by development under the Washoe County Regional Plan for the Stead/Lemmon Valley Area.

ALTERNATIVE A – CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

Impacts associated with Alternative A would be the same as those identified for the Proposed Actions.

NO ACTION ALTERNATIVE

Common to Proposed Actions

Under the No Action Alternative, no impacts would occur to Native American traditional or religious values within the Projects Area.

MONITORING AND MITIGATION MEASURES

Measures Common to Proposed Actions

In the absence of any identified impacts, monitoring and mitigation measures would not be required. However, the ongoing consultation process may result in identification of Native American Religious Concerns/Indian Trust Responsibilities, which will be reviewed and, as appropriate and necessary, monitoring and mitigation measures would be developed.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Common to Proposed Actions

Based on preliminary findings, the Proposed Actions would not impact Native American traditional or religious values. As a result, there would be no irreversible or irretrievable impacts. However, should the ongoing consultation process result in identification of Native American Religious Concerns/Indian Trust Responsibilities be considered an irreversible or irretrievable commitment of resources, they would be reviewed and considered during preparation of the ROD.

RESIDUAL EFFECTS

Effects Common to Proposed Actions

There would be no residual effects to Native American Religious Concerns/Indian Trust Responsibilities resulting from implementation of the Proposed Actions and Alternatives. The ongoing consultation process may result in identification of Native American Religious Concerns/Indian Trust Responsibilities regarding residual effects of the proposed Project, which would be reviewed and considered during preparation of the ROD.

ENVIRONMENTAL JUSTICE

SUMMARY

Potential direct and indirect impacts associated with the Proposed Actions or Alternative A would not have a disproportionate effect on minority populations. Two low-income populations have been identified in or near the Projects Area and neither would receive a disproportionate impact from implementation of the Proposed Actions.

DIRECT AND INDIRECT IMPACTS

Impacts Common to Proposed Actions

The Reno-Sparks Indian Colony and Pyramid Lake Paiute Tribe are identified as minority and low-income populations within the Projects Area; however, no environmental effects are expected to disproportionately affect these minority or low-income populations. There would be no effect on Environmental Justice values.

Service Area

Development of housing and community infrastructure in accord with the Washoe County Regional Plan for the Stead/Lemmon Valley Area as a consequence of the proposed Projects are not expected to result in environmental effects that would be have a disproportionate impact on either the Reno-Sparks Indian Colony or Pyramid Lake Paiute Tribe.

ALTERNATIVE A – CONSTRUCT PIPELINES WITHIN COMMON RIGHT-OF-WAY

Impacts associated with Alternative A would be the same as those identified for the Proposed Actions.

NO ACTION ALTERNATIVE

Common to Proposed Actions

Under the No Action Alternative, no impacts would occur to Environmental Justice values within the Projects Area.

MONITORING AND MITIGATION MEASURES

Measures Common to Proposed Actions

No environmental justice effects would occur, and no mitigation is necessary. The Environmental Justice impact analysis was prepared based on year 2000 census data because these were the only data available.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Common to Proposed Actions

Based on preliminary findings, the Proposed Actions would not impact Environmental Justice values. As a result, there would be no irreversible or irretrievable impacts.

RESIDUAL EFFECTS

Effects Common to Proposed Actions

There would be no residual effects to Environmental Justice concerns resulting from implementation of the Proposed Actions and Alternatives.

CUMULATIVE EFFECTS

INTRODUCTION

This section summarizes potential cumulative environmental impacts on resources in the North Valleys area that could result from the Proposed Actions. As stated in 40 CFR 1508.7, "…'cumulative impact' is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency [Federal or non-Federal] or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively *significant* actions taking place over a period of time…."

Cumulative effects are evaluated for those resources for which potential direct or indirect impacts have been identified earlier in this chapter. The cumulative effects analysis included in this section does not consider implementation of mitigation measures that may be required by BLM or other agencies that have jurisdiction over the proposed Projects or other past, present, and future activities in the area. BLM has determined that the following resources would not be adversely affected by implementation of the Proposed Actions and are therefore not discussed in this section:

- Geology, Minerals and Paleontology
- Access and Land Use
- Recreation
- Noise
- Cultural Resources
- Native American Religious Concerns/Indian Trust Responsibilities
- Environmental Justice.

The geographic area considered in analyzing cumulative effects varies depending on the resource being evaluated. **Figure 2-1** depicts the general area used to analyze potential cumulative effects associated with the Proposed Actions. Primary features of the cumulative effects area include areas within and proximal to: Honey Lake Valley, Dry Valley, and Bedell Flat that could be affected by groundwater drawdown resulting from proposed production wells; the corridor for proposed water transmission pipeline rights-of-way in Honey Lake Valley, Dry Valley, Bedell Flat, Antelope Valley, and Lemmon Valley; and the terminus area of final water storage and distribution in the Stead/Lemmon Valley Area.

PAST AND PRESENT ACTIVITIES

Portions of the Projects Area have been authorized as utility corridors including the Tuscarora Natural Gas Pipeline and electrical power corridors for Sierra-Pacific Power Company. Livestock grazing and dispersed recreation activities have been and continue to be dominant land uses on public land within the proposed rights-of-way for the Projects. Use of groundwater within the area includes irrigation and crop production, domestic water supply, livestock water supply, and water sources for wildlife.

REASONABLY FORESEEABLE FUTURE ACTIVITIES

LAND USE

Foreseeable activities within the rights-of-way corridor associated with the Proposed Actions include grazing, dispersed recreation, and increased off-highway vehicle use. Build-out of residential and commercial property within the Stead/Lemmon Valley Area and the area encompassed by the North Valleys Area Plan would increase use of adjacent public land.

Increased recreational activity on public land adjacent to residential and commercial development could result in potential in increased conflicts among public land users. OHV activities may conflict with hunting, hiking, and other forms of recreation. Management of public land in the North Valleys area may require changes or modifications in the current management prescriptions for the area as outlined in the Carson City Comprehensive Resource Management Plan.

WATER WITHDRAWAL AND USE

Water Rights

Based on water rights applications on file with the Nevada State Engineer, foreseeable activities within the areas of groundwater withdrawal associated with the Proposed Actions include continued production of groundwater to supply water to meet demands in the geographic area encompassed by the North Valleys Area Plan for residential and commercial development and to meet agricultural and rural residential demand in Honey Lake Valley and other areas of Washoe County.

The current change of use right maintained by Fish Springs Ranch that allows importation of water from eastern Honey Lake Valley to the Stead/Lemmon Valley Area specifies that up to 13,000 af/yr of water could be imported via the change in use designation. Fish Springs Ranch currently has rights to 14,146 af/yr assigned by the State Engineer to the previous owner of the Fish Springs Ranch. Although not proposed by Fish Springs Ranch, it is reasonably foreseeable that importation of water could increase to 13,000 af/yr at some point in the future.

The Fish Springs Ranch Water Supply Project is sized to provide a maximum groundwater pumping and transmission rate of 8,000 af/yr. The proposed pipeline and pump station design concept is intended to minimize initial capital costs and ongoing operations and maintenance expenses. Design flow rate for the pipeline and main pump station is 6,000 gal/min, based on continuous operation for 20 hours/day. The proposed pipeline diameter would be up to 30 inches. The limiting segment of pipeline is the 30-inch diameter, 24-mile long segment from the top of the pass in the Fort Sage Mountains (elevation 5520 feet amsl) to the terminal storage tank site (elevation 5510 feet amsl). Because the elevation of these two points is similar, the hydraulic grade line at the tank at Fort Sage Pass, and the velocity and friction losses in the 30-inch diameter pipeline segment, would control the amount of flow in the pipeline.

Future proposals to increase annual pumping beyond 8,000 af/yr would require additional permitting approvals for necessary infrastructure improvements. For instance, capacity in the 30-inch diameter Bedell Flat pipeline segment could be increased by the addition of a second booster pump station. Installation of the second booster station would involve construction of new facilities such as a booster pump station, power supply, surge suppression facilities, and maintenance roads. Such improvements would involve new discretionary approvals from local government entities and/or BLM.

Intermountain Water Supply currently has water rights totaling 3,000 af/yr in Dry Valley and 144 af/yr in Bedell Flat. Intermountain Water Supply's Proposed Action includes withdrawal of 2,000 af/yr in Dry Valley and 500 af/yr in Bedell Flat. Based on demand for water throughout the Stead/Lemmon Valley Area, it is reasonably foreseeable that, pending receipt of authorization from agencies with jurisdiction over expansion of Intermountain Water Supply's proposed Project, an additional 1,000 af/yr could be pumped from Dry Valley and delivered to the Stead/Lemmon Valley Area.

Delivery of water in excess of the amount specified in the Proposed Actions could allow continued implementation of the Truckee Meadows Regional Plan. Construction of housing, community infrastructure, and use of water to reduce or offset current sources of water into the greater Reno/Sparks area could result from importation of additional water via the existing importation right or future authorizations from the State Engineer.

Proposed Granite Fox Power Plant

A notice of intent (NOI) to prepare an EIS has been filed by the BLM Winnemucca Field Office for the Granite Fox Power Plant project located north of Gerlach, Nevada. Granite Fox Power LLC's proposed 1,450 megawatt coal-fired power plant project would include securing water rights in the Smoke Creek Desert totaling 25,000 af/yr, of which the proposed power plant would use 16,000 af/yr. Withdrawal of this volume of groundwater from the Smoke Creek Desert area may combine with predicted effects of groundwater pumping associated with the Fish Springs Ranch well system in eastern Honey Lake Valley to potentially impact groundwater resources in Smoke Creek Desert and recharge to Pyramid Lake Valley. To date, Granite Fox Power LLC has not secured the water rights, nor has the Nevada State Engineer granted a change in use from agriculture to industrial uses for water rights sought by Granite Fox Power.

Proposed Warm Springs Valley/ Winnemucca Valley to Lemmon Valley Water Pipeline Project

In July 1998, Intermountain Pipeline, Ltd. filed a preliminary draft application for a right-of-way to cross public land administered by the BLM Carson City Field Office. The right-of-way application was to allow construction of a water pipeline that would convey groundwater pumped from a well system in the Winnemucca and Warm Springs valley areas approximately 17 miles to Lemmon Valley. Agricultural use of the water would be retired and Intermountain Pipeline, Ltd. was seeking change of use and importation rights for the water source to provide water to Lemmon Valley from the State Engineer.

The preliminary right-of-way proposal included pumping rates totaling 2,900 af/yr for the well arrays located in Winnemucca Valley (Winnemucca Ranch and Marshall Ranch) and along Warm Springs Creek; conveyance of produced water via a 12-inch diameter pipeline for 17 miles to Lemmon Valley; installation of in-stream groundwater recharge areas; installation of a 24-acre off-channel recharge basin; and installation of three booster pump stations along the pipeline route. Pump stations would be powered by extension of overhead electrical distribution lines to each station.

Demand for sources of water to supply planned development in areas encompassed by the North Valleys Area Plan is expected to continue into the future. No action has occurred on this application since the preliminary application was provided to BLM in 1998.

CUMULATIVE EFFECTS ON RESOURCES

AIR RESOURCES

The Washoe County air quality program monitors ambient $PM_{2.5}$, PM_{10}, CO, and ozone air quality at several locations. Monitoring data indicate effects of existing industrial, commercial, and governmental pollutant sources, as well as mobile emissions sources. Emissions associated with construction equipment and activities for the Proposed Actions would be temporary and are not expected to have lasting impacts on air quality in the region. These emissions could combine with other existing sources of air emissions within the region.

Increases in population associated with development in the Stead/Lemmon Valley Area as a result of the proposed Projects combined with current and reasonably foreseeable development associated with importation of more water (see "*Water Rights"* section above) would increase traffic volume, construction activity, and community services (garbage pickup, street maintenance). All of these activities would result in increased gaseous and dust emissions above background levels in the area. Depending on traffic volume and access, unpaved roads in the development area would eventually become paved; thereby reducing fugitive dust levels from these sources.

Construction and operation of the proposed Granite Fox Power Plant in Smoke Creek Desert north of Gerlach, Nevada would represent a new long-term emission source in the region. The power plant would be required to obtain an air quality permit and meet emission limits associated with that permit.

WATER RESOURCES

Proposed groundwater pumping of 8,000 af/yr in eastern Honey Lake Valley, 2,000 af/yr in west-central Dry Valley, and 500 af/yr in Bedell Flat could result in cumulative drawdown effects with other pumping in these basins, and possibly surrounding basins. Any increases in pumping in eastern Honey Lake Valley beyond the proposed withdrawals at Fish Springs Ranch, Smoke Creek Desert, or Pyramid Lake Valley could cumulatively add to groundwater drawdown in eastern Honey Lake Valley.

Potential groundwater pumping rates of 16,000 af/yr associated with the proposed Granite Fox Power Plant in the Smoke Creek Desert north of Gerlach, Nevada could affect groundwater flow to adjacent valleys including Pyramid Lake Valley and Honey Lake Valley. It is uncertain at this time what effect the proposed power plant groundwater withdrawal could have on these adjacent areas. However, since the proposed power plant production wells would be located in excess of 25 miles north of Fish Springs Ranch's proposed production wells and the divide between Smoke Creek Desert and Pyramid Lake Valley, BLM has determined that it is unlikely that groundwater withdrawal associated with the proposed power plant would combine to have an additive effect on groundwater flow in either basin. The recommended regional groundwater monitoring program outlined in **Appendix D** would be used to determine if and when actual effects of pumping vary substantially from those predicted in the EIS.

Additional pumping in Dry Valley and Bedell Flat is not expected beyond the Proposed Actions, except possibly some domestic well pumping at relatively low rates in these basins. Substantial groundwater pumping in Long Valley proximal to Dry Valley, however, could result in cumulative drawdown in that area. Groundwater pumping in Warm Springs Valley also could have a cumulative effect on groundwater drawdown in the vicinity of eastern Dry Valley and Bedell Flat. Any cumulative groundwater drawdown in the area could result in additional adverse effects to springs, flowing wells, and associated wetland habitat.

Implementation of the proposed groundwater pumping project (Intermountain Pipeline, Ltd. 1998) for the Warm Springs Valley and Winnemucca Valley could combine with existing pumping in these valleys and pumping associated with the Proposed Action in Dry Valley and Bedell Flat to lower groundwater levels and reduce flow in surface water features in these valleys. Groundwater drawdown predictions have not been completed for the proposed Warm Springs Valley/Winnemucca Valley pipeline project because this proposed right-of-way application has not been advanced since 1998. Should there be renewed interest in developing this source of water for importation into the Stead/Lemmon Valley Area, additional investigation would be completed to evaluate potential impacts to water resources in these areas.

Increases in population associated with development in the Stead/Lemmon Valley Area as a result of the proposed Projects combined with current and reasonably foreseeable development associated with importation of more water (see "*Water Rights*" section above) would result in several potential water-related cumulative effects, increased recharge to groundwater; increased nutrient loading to groundwater and possibly surface water; erosion and sedimentation from construction activities; and increased surface water runoff.

SOIL RESOURCES

Potential impacts to soil from construction of the proposed Projects would include loss of soil productivity due to changes in soil structure from mixing and handling, decreased vegetative cover, water and wind driven soil loss, and compaction from roads, construction, and livestock grazing. These effects are localized near construction sites. Reclamation associated with construction disturbance and future restoration activities would ameliorate soil loss and productivity loss. Soil salvaged and used in reclamation would become viable once vegetation is established.

If additional groundwater pumping projects are developed in the Projects Area, similar localized construction-related effects on soil resources would occur. Other activities within the Study Area that impact soil resources include OHV, roads, and grazing. These activities also have localized impacts on soil resources and do not contribute to soil losses on a watershed scale. If the proposed Granite Fox Power Plant is constructed in Smoke Creek Desert, the distance of about 50 miles separating the power plant site from the North Valleys area would preclude any cumulative soil effects.

Housing and commercial development in the Stead/Lemmon Valley Area and potential development in other valleys encompassed by the North Valleys Area Plan would result in conversion of land from the current open range condition to urban landscapes, roads, and highways. The native soil would be temporarily disturbed, some of which will be displaced with buildings, paved areas, landscaping, and roads.

VEGETATION RESOURCES

Cumulative effects on vegetation would result from wildfire, livestock grazing, and trampling. Locally and regionally, wildfires have reduced the density of shrubs and trees sensitive to fire (e.g., sagebrush, bitterbrush, and juniper). Fires have resulted in replacement of shrub communities by grass-dominated communities, often with a component of the invasive species cheatgrass brome. Heavy livestock grazing and trampling have adversely affected the vigor and productivity of grasses and forbs, resulting in proliferation of noxious weeds and other species of low-forage value for livestock and wildlife.

Construction of the Tuscarora Natural Gas Pipeline and Sierra Pacific Transmission Line has altered natural vegetation in areas adjacent to the proposed Projects. Noxious weeds have increased in some areas disturbed by past pipeline and transmission line construction. These cumulative effects have substantially altered the composition, density, and spatial distribution of native plant communities. Similar effects would occur in the vicinity of the proposed Granite Fox Power Plant if it is constructed near the town of Gerlach, Nevada in Smoke Creek Desert, approximately 50 miles from the North Valleys area. The Proposed Actions could incrementally add to this reduction in plant community productivity and diversity and could lead to the proliferation of noxious weeds and other invasive species.

Proposed groundwater pumping of 8,000 af/yr in eastern Honey Lake Valley, 2,000 af/yr in western Dry Valley, and 500 af/yr in Bedell Flat could result in cumulative drawdown effects with other pumping in these or other adjacent basins. This could occur if additional pumping occurs in Honey Lake Valley beyond the proposed 8,000 af/yr at Fish Springs Ranch, increased pumping in the Dry Valley basin, or if additional pumping occurs in other adjacent basins, such as Warm Springs Valley. As a result, additional adverse impacts may occur to wetland habitat from reduced flow at springs and/or flowing wells. Additional pumping in Dry Valley and Bedell Flat is not expected beyond the Proposed Actions, except possibly some domestic well pumping at relatively low rates in these basins.

Housing and commercial development in the Stead/Lemmon Valley Area and potential development in other valleys encompassed by the North Valleys Area Plan would result in conversion of land from the current open range condition to urban landscapes, roads, and highways. The native vegetation would be displaced with typically imported vegetation species associated with urban settings.

WILDLIFE RESOURCES

Effects to wildlife would result from the Proposed Actions, acting cumulatively with wildfire, livestock grazing and trampling, and past construction of the Tuscarora Pipeline and Sierra Pacific Transmission Line. Similar effects could occur in the vicinity of the proposed Granite Fox Power Plant if it is constructed near the town of Gerlach, Nevada in Smoke Creek Desert, approximately 50 miles from the North Valleys area. These factors would cumulatively reduce the amount of forage and cover available to wildlife resulting in decreased capacity of the Projects Area and adjacent areas to support some wildlife species, especially those closely associated with sagebrush and juniper habitats (i.e., pygmy rabbit, sage grouse, mule deer, and pronghorn antelope).

Proposed groundwater pumping of 8,000 af/yr in eastern Honey Lake Valley, 2,000 af/yr in western Dry Valley, and 500 af/yr in Bedell Flat could result in cumulative drawdown effects with other pumping in these and adjacent basins. This could occur if additional pumping occurs in Honey Lake Valley beyond the proposed 8,000 af/yr at Fish Springs Ranch, increased pumping rates in Dry Valley, or if additional pumping occurs in other adjacent basins.

Based on model results for groundwater pumping as described in Intermountain Water Supply's Proposed Action for Bedell Flat, groundwater flow in adjacent valleys including Warm Springs Valley and Winnemucca Valley could be reduced by approximately 3 percent of the total recharge available to these valleys. Proposed pumping in Dry Valley also could affect groundwater flow by an unknown amount in Winnemucca Valley.

Implementation of the proposed groundwater pumping project (Intermountain Pipeline, Ltd. 1998) for the Warm Springs Valley and Winnemucca Valley could combine with existing pumping in these valleys and pumping associated with the Proposed Action in Dry Valley and Bedell Flat to reduce flow in surface water features in these valleys. This combination of pumping effects could impact known Carson wandering skipper habitat in Winnemucca Valley by reducing water flow in springs and seeps that support this habitat as well as habitat for waterfowl, shorebirds, and bats.

Groundwater drawdown predictions have not been compiled for the proposed Warm Springs Valley/Winnemucca Valley pipeline project because this proposed right-of-way application has not been advanced since 1998. Should there be renewed interest in developing this source of water for importation into the Stead/Lemmon Valley Area, additional investigation would be completed to evaluate potential impacts to Carson wandering skipper habitat in these areas.

Housing and commercial development in the Stead/Lemmon Valley Area and potential development in other valleys encompassed by the North Valleys Area Plan would result in conversion of land from the current open range condition to urban landscapes, roads, and highways. The native wildlife and their habitat would be displaced with buildings, paved areas, landscaping, and roads associated with urban settings.

VISUAL RESOURCES

Cumulative effects to visual resources would include roads in the Projects Area and pump stations, storage tanks, and an electrical substation. Construction of other water pumping projects in Honey Lake Valley or other nearby basins, and/or the proposed Granite Fox Power Plant in Smoke Creek Desert, would also contribute to cumulative visual effects in the region. These features would continue to disrupt natural visual elements.

Development of housing and commercial buildings in the Stead/Lemmon Valley Area could combine with additional development associated with other valleys encompassed by the North Valleys Area Plan to modify the existing landscape from open range to urban elements. The modification of the landscape would change color, form, and texture of the visual setting.

SOCIAL AND ECONOMIC RESOURCES

The projected total population that could be served through implementation of the proposed Projects would be approximately 41,600 if all the water was used for residential purposes, less than the 66,700 residents projected by the Washoe County Community Development office at full build-out in the area encompassed by the North Valleys Area Plan. However, the Reno-Stead Airport estimates an ultimate water need of approximately 3,000 af/yr to achieve current development plans including domestic and landscaping requirements. Purveyors would determine which customers are able to obtain the water necessary to fulfill planned development.

Increasing the amount of water pumped and delivered up to the importation right of 16,500 af/yr (13,000 af/yr from Honey Lake Valley and 3,500 af/yr from Dry Vally/Bedell Flat) to the Stead/Lemmon Valley Area would allow an additional 25,000 people to be served.

If the proposed Granite Fox Power Plant were constructed near the town of Gerlach, Nevada, cumulative social and economic effects could occur from its construction and operation.

CHAPTER 5

CONSULTATION, COORDINATION, AND PREPARATION

PUBLIC PARTICIPATION SUMMARY

Public participation specific to the North Valleys Rights-of-Way Projects EIS is summarized in this chapter. The summary indicates how the public has been involved, identifies persons and organizations contacted for feedback, and identifies the process BLM used in accomplishing goals in accordance with 40 CFR 1506.6.

Public involvement in the EIS process includes the steps necessary to identify and address public concerns and needs. The public involvement process assists agencies in: (1) broadening the information base for decision making; (2) informing the public about Proposed Actions and potential long-term impacts that could result from the Projects; and (3) ensuring that public needs are understood by the agencies.

Public participation in the EIS process is required by NEPA at four specific points: scoping period, review of Draft EIS, review of Final EIS, and receipt of the Records of Decision.

- **Scoping**: The public is provided a 30-day scoping period to disclose potential issues and concerns associated with the Proposed Action. Information obtained by the agencies during public scoping is combined with issues identified by the agencies and this forms the scope of the EIS.

- **Draft EIS Review:** A 60-day Draft EIS review period is initiated by publication of Notice of Availability for the Draft EIS in the Federal Register. A public meeting will be held in Reno, Nevada during the 60-day comment period.

- **Final EIS Review:** A 30-day Final EIS review period is initiated by publication of Notice of Availability for the Final EIS in the Federal Register.

- **Records of Decision:** Subsequent to the 30-day review period for the Final EIS, Records of Decision (one for each Proposed Action) would be prepared.

IMPLEMENTATION

The public participation process for the North Valleys Rights-of-Way Projects EIS is comprised of the following four components:

1. PUBLIC SCOPING PERIOD AND MEETINGS

Publication of a Notice of Intent (NOI) initiated a public scoping period on September 15, 2003. The NOI summarized the Proposed Actions and a determination by BLM that an EIS would be necessary for analysis of the Fish Springs Ranch and Intermountain Water Supply proposals. The news media and public were notified of the public comment period. The public scoping period ended on January 31, 2004.

Scoping letters were mailed to individuals and organizations announcing the scoping period and describing the Proposed Actions. Issues regarding the proposed Projects identified by BLM also were included in the mailing.

BLM held open house and public presentations on eight occasions between October 2, 2003 and January 7, 2004. Scoping comments were received from seventeen individuals and organizations. Concurrent with these actions, BLM issued a news release to local news organizations and radio stations with coverage in the surrounding geographical regions.

2. DISTRIBUTION OF DRAFT EIS

The Draft EIS was distributed as follows:

- A Notice of Availability was published in the Federal Register on May 20, 2005 specifying dates for the 60-day public comment period which ended July 20, 2005.

- A news release provided to all area media by BLM at the beginning of the 60-day comment period on the Draft EIS. The date, time, and location of public meetings to receive comments on the Draft EIS were submitted to area newspapers. The following meetings were held:

    - Open-house public meeting held at the BLM State Office, Reno, Nevada on June 7, 2005.
    - Presentation to North Valleys Community Advisory Borad on June 13, 2005.
    - Presentation to North Valley Neighborhood Advisory Board on June 20, 2005.
    - Public meeting held at the Susanville Community Center, Susanville, California on June 28, 2005.
    - Open-house public meeting held at BLM State Office, Reno, Nevada on July 6, 2005.

- The Draft EIS was distributed to interested parties identified on the updated Carson City Field Office EIS mailing list.

BLM received 26 letters from individuals, private companies, and federal and state agencies commenting on the Draft EIS. A list of letters received, the content of each letter, and BLM's responses to comments are contained in Chapter 7 of the Final EIS.

3. DISTRIBUTION OF FINAL EIS

The Final EIS has been distributed as follows:

- Notice of Availability was published in the Federal Register;

- Copies of the Final EIS have been sent to addresses on the Carson City Field Office mailing list;
- The Final EIS will be posted on the BLM website (if available); and
- A news release issued to the same news outlets used for previous project announcements.

4. RECORDS OF DECISION

A Record of Decision will be distributed by BLM for each of the two Proposed Actions to individuals and organizations identified on the updated Project mailing list. A news release will be provided to the news media.

CRITERIA AND METHODS BY WHICH PUBLIC INPUT IS EVALUATED

Letters and oral comments received by BLM on the Draft EIS have been reviewed and evaluated by the agency to determine if information provided in the comments would require a formal response or contains new data that may identify deficiencies in the EIS. Revisions have been made in the Final EIS to address substantive comments received during the 60-day public comment period. In addition, the Final EIS contains Chapter 7 - *Response to Comments*. This section provides responses to comments BLM received on the Draft EIS.

CONSULTATION WITH OTHERS

In addition to the cooperating agencies identified in Chapter 1, the following state and federal agencies were consulted during preparation of the EIS:

- Nevada Department of Conservation and Natural Resources
- Nevada Department of Human Resources
- Nevada State Clearinghouse
- U.S. Army Corps of Engineers

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MAILING LIST
NORTH VALLEYS RIGHTS-OF-WAY PROJECTS

This document was mailed to approximately 100 agencies and individuals.

CHAPTER 6

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CHAPTER 7

RESPONSE TO COMMENTS

INTRODUCTION

This chapter contains copies of comment letters, emails, and completed comment forms obtained during various public meetings from the public, companies, and federal, state, and local governmental units regarding the North Valleys Rights-of-Way Projects Draft EIS. A total of 26 letters, emails, and/or completed comment forms were received during the 60-day public comment period which ended on July 20, 2005.

This chapter also provides BLM's responses to substantive comments. Some responses direct the reader to sections of the Final EIS that have been revised to address the comment.

The following is a list of letters or emails received:

1. U.S. Environmental Protection Agency
2. U.S. Bureau of Indian Affairs
3. Pyramid Lake Water Resources – Pyramid Lake Paiute Tribe
4. Stetson Engineers Inc. – Pyramid Lake Paiute Tribe
5. State of Nevada – Division of Water Resources
6. State of Nevada – State Health Division
7. State of Nevada – Department of Transportation
8. State of Nevada – Department of Conservation and Natural Resources – Division of State Lands
9. State of Nevada – Public Utilities Commission
10. Washoe County Community Development
11. Truckee Meadows Regional Planning Agency
12. Airport Authority of Washoe County
13. California Department of Water Resources
14. Lassen County, California – Board of Supervisors
15. Toiyabe Chapter of the Sierra Club
16. Tom Myers – Sierra Club
17. Bob Fulkerson – Progressive Leadership Alliance of Nevada
18. Lifestyle Homes TND, LLC
19. Tim Draper
20. Laura Blichenstaff
21. Grover Greeves – Email
22. Robert and Susan Reaney – Email
23. John C. Fuller
24. B. Sachau – Email
25. Kelley Holmes
26. Terry Wolverton – Tuscarora Gas

Letter 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

2005 AUG -1 PM 2:17

RECEIVED
BUREAU OF LAND MGMT
CARSON CITY
FIELD OFFICE

July 26, 2005

Terri Knutson
Carson City Field Office
Bureau of Land Management
5665 Morgan Mill Road
Carson City, NV 89701

Subject: North Valleys Rights-of-Way Projects Draft Environmental Impact Statement (DEIS), Washoe County, NV

Dear Ms. Knutson:

The U.S. Environmental Protection Agency (EPA) has reviewed the above referenced document. Our review and comments on this DEIS are provided pursuant to our authorities under the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA Implementation Regulations at 40 CFR 1500-1508, and Section 309 of the Clean Air Act.

We have rated the DEIS as EC-2 – "Environmental Concerns - Insufficient Information" (see enclosed "Summary of Rating Definitions"). Based on our review of the DEIS, we have serious concerns about the potential indirect and cumulative impacts of the proposed project on water, air, and biological resources. In our February 17, 2004, scoping letter and March 28, 2005, comment letter on the administrative DEIS for the North Valleys project, EPA provided comments and made recommendations on issues to be addressed in the DEIS, including indirect and cumulative impacts; water, air, and biological resources; and mitigation and monitoring. We reiterate several of those comments here and recommend that additional analysis and commitments to mitigation be provided in the Final Environmental Impact Statement (FEIS).

The proposed project involves Bureau of Land Management (BLM) approval of two pipeline rights-of-way to convey 8,000 acre-feet/year of water from Fish Springs Ranch (FSR) in the Honey Lake Valley and 3,500 acre-feet/year of water from Dry Valley and Bedell Flat. The DEIS acknowledges that export of up to 13,000 acre-feet/year from FSR is a reasonably foreseeable future action, and it appears that the FSR pipeline could accommodate this amount of water. We are seriously concerned about the potential cumulative impacts to wetlands, springs, and wells; vegetation and wildlife; and air quality from future exports of up to 13,000 acre-feet/year from Honey Lake Valley. However, the DEIS does not sufficiently describe and discuss the potential impacts of this foreseeable future action. The FEIS should include a detailed discussion of the potential cumulative impacts and identify measures that could be taken to avoid these impacts. We believe that, prior to any future water export from FSR exceeding 8,000 acre-feet/year, a thorough analysis of such export should be conducted by the appropriate State and/or local agencies. We also have concerns regarding water, air, and biological resources in the North Valleys service area and recommend these issues be further addressed in the FEIS. Our detailed comments are enclosed.

We appreciate the opportunity to review this DEIS. Please send a copy of the FEIS to this office at the same time it is officially filed with our Washington, DC, office. If you have any questions, please call me at (415) 972-3846 or Jeanne Geselbracht at (415) 972-3853.

Sincerely,

Nova Blazej, Acting Manager
Environmental Review Office

004246

Enclosures: Summary of Rating Definitions
EPA's Detailed Comments

cc: Nevada State Engineer
U.S. Fish and Wildlife Service
U.S. Bureau of Indian Affairs
U.S. Geological Survey
Sierra Army Depot
Susanville Indian Rancheria
California Department of Water Resources
California Department of Fish and Game
Lassen County, California
Washoe County, Nevada
Truckee Meadows Regional Planning Agency
Airport Authority of Washoe County
City of Reno
City of Sparks

SUMMARY OF EPA RATING DEFINITIONS

This rating system was developed as a means to summarize EPA's level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the EIS.

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

ADEQUACY OF THE IMPACT STATEMENT

Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

North Valleys Water Projects Draft EIS
EPA Comments – July, 2005

Cumulative Impacts

The proposed project is Bureau of Land Management (BLM) approval of two pipeline rights-of-way to convey 8,000 acre-feet/year of water from Fish Springs Ranch (FSR) and 3,500 acre-feet/year of water from Dry Valley and Bedell Flat to the North Valleys service area. FSR has a legal water right granted by the Nevada State Engineer of 14,108 acre-feet/year, 13,000 acre-feet/year of which can be exported out of the Honey Lake basin. Although the current proposed project is for export of 8,000 acre-feet/year, the water pipeline could annually accommodate a volume greater than 8,000 acre-feet. Furthermore, we are unaware of any commitment that would preclude FSR from exercising its full water right. The Draft Environmental Impact Statement (DEIS) acknowledges that future water export from FSR of 13,000 acre-feet per year is reasonably foreseeable; however, the DEIS contains no quantitative analysis regarding the cumulative impacts of this future action. For example, the DEIS, *Water Resources* (p. 4-95), states, "Any increases in pumping in eastern Honey Lake Valley beyond the proposed withdrawals at Fish Springs Ranch, Smoke Creek Desert, or Pyramid Lake Valley could cumulatively add to groundwater drawdown in eastern Honey Lake Valley." The DEIS, *Vegetation* (p. 4-97), states that if additional pumping occurs in Honey Lake Valley beyond the proposed 8,000 acre-feet/year at FSR, "additional adverse impacts may occur to wetland habitat from reduced flow at springs and/or flowing wells."

We are seriously concerned about the potential cumulative impacts from future exports of up to 13,000 acre-feet/year from Honey Lake Valley. According to BLM's 1993 DEIS on the Bedell Flat Pipeline Right-or-Way, export of 13,000 acre-feet/year from FSR is beyond the safe yield of the aquifer. In comparison with export of 8,000 acre-feet/year, export of 13,000 acre-feet/year of groundwater from Honey Lake Valley would result in a much larger groundwater cone of depression, greater land subsidence, an increased loss of springs, wetlands, wells, and phreatophytic vegetation, other habitat modification, and impacts to wildlife. Hundreds of acres of wetlands and as many as 13,000 acres of Black Greasewood habitat in Honey Lake Valley and Smoke Creek Desert could be lost or modified. As groundwater is drawn down below its rooting depth, greasewood would die and particulate emissions would increase, degrading air quality.

The current DEIS relies on updated groundwater models, based on export of 8,000 acre-feet/year, but does not quantify the potential impacts to the source area or the service area from pumping and export of up to 13,000 acre-feet/year. Water export greater than 8,000 acre-feet/year to the North Valleys service area would result in more growth, resulting in the need for even more waste water and stormwater treatment capacity, greater effects to receiving waters, additional air emissions, and more habitat modification. These impacts are reasonably foreseeable and, consistent with 40 CFR 1508.25, are within the scope that should be analyzed in the current North Valleys EIS.

Recommendation: The discussions and recommendations in the sections below refer to both the BLM-preferred alternative, as well as the anticipated future scenario in which
1 – 1 FSR exercises its full water right. The FEIS should describe and quantify all of the potential impacts, addressed below, of a scenario in which FSR exercises it full water right, both in the FSR as well as the North Valleys service area. Identify methodologies used and reference the scientific and other sources relied upon for conclusions in this regard, in accordance with 40 CFR 1502.24.

Recommendation: The FEIS and Record of Decision (ROD) should identify measures
1 – 2 that could be taken to avoid adverse cumulative and indirect impacts, and discuss the probability of the mitigation measures being implemented (see the Council on Environmental Quality's memorandum regarding Forty Questions and Answers About the NEPA Regulations[1], 19b). Identify legally binding commitments that will be made to
1 – 3 ensure that pumping beyond safe yield does not occur at any future time. The FEIS and ROD should identify the parties to such commitments and identify who would monitor and enforce them. If such commitments and/or enforcement measures are not feasible or will not be made, the FEIS should disclose this.

1 – 4 **Recommendation:** The FEIS should identify the maximum water carrying capacity of the proposed FSR pipeline, and discuss whether downsizing the pipe is a practicable measure to ensure against over draughting the aquifer. Other feasible measures should be
1 – 5 identified to mitigate the potential impacts of future pumping beyond 8,000 acre-feet/year. The FEIS should indicate the feasibility and anticipated efficacy of such measures to offset impacts.

1 – 6 **Recommendation:** We recommend the FEIS and ROD include a recommendation to appropriate State and local agencies that a thorough analysis of the potential impacts of water export exceeding 8,000 acre-feet/year from FSR be conducted prior to such export.

<u>Indirect Impacts</u>

According to the DEIS (p. 4-80), indirect impacts would result from urban growth in the North Valleys service area. Without imported water into the service area, the North Valleys would be unable to grow because Washoe County requires adequate water rights as a condition of approval of any subdivision in the planning area. However, the DEIS does not sufficiently address the indirect impacts of growth in the service area. Pursuant to 40 CFR 1502.16, the EIS should evaluate both the direct and indirect effects of the project. Indirect effects, which are defined at 40 CFR 1508.8(b), "are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing

[1]Council on Environmental Quality, *Memorandum for Federal NEPA Liaisons, Federal, State and Local Officials and Other Persons Involved in the NEPA Process*, March 16, 1981 ("Forty Questions").

1 – 1
The Proposed Action for Fish Springs Ranch (FSR) is a maximum of 8,000 acre-feet per year (af/yr) and this EIS discloses potential impacts associated with this pumping rate. See revised text in the *Direct and Indirect Impacts* section of *Water Resources* in Chapter 4. See also revised text in the *Cumulative Effects* section of *Water Resources* in Chapter 4. Methodologies are described and references are identified throughout the Final EIS with respect to the analysis of impacts.

The current pipeline design and configuration would allow water transmission up to 8,000 af/yr. To increase the volume of water delivery through the pipeline would require additional pump facilities and associated infrastructure be added to the pipeline system. The addition of these facilities would require additional permits and authorization from local governmental entities and/or BLM. This discussion has been added to Chapter 4 in the Final EIS.

1 – 2
See new Appendix D (*Recommended Water Resources Monitoring and Management Plan*) as part of this Final EIS. Table 1-1 (Regulatory Responsibilities) provides a listing of agencies and their responsibilities relating to the proposed Projects.

1 – 3
See revised Table 1-1 (Regulatory Responsibilities) for a listing of agencies that have responsibility over various aspects of the Projects. As part of water appropriation permit application review and authorization, the Nevada State Engineer has authority to approve and control the amount of groundwater pumping from basins in Nevada. BLM has authority to approve the pipeline rights-of-way and location of ancillary facilities on federal land. BLM will not issue Records-of-Decision (RODs) for the proposed rights-of-way projects until the applicants have secured necessary permits to proceed with the projects.

1 – 4
The first sentence of the last paragraph on page 2-7 of the Draft EIS is revised: "The Fish Springs Ranch water transmission pipeline has been designed to convey a maximum of 8,000 af/yr."

1 – 5
See new Appendix D (*Recommended Water Resources Monitoring and Management Plan*) as part of this Final EIS, which includes monitoring for groundwater levels and quality; flow and quality of springs, and characteristics of riparian areas. See also Response 1-1.

1 – 6
As stated in Response 1-1, the Proposed Action for Fish Springs Ranch is to pump and convey a maximum of 8,000 af/yr. See also Response 1-2.

effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems." These effects should be evaluated and disclosed to the public and decisionmakers regardless of whether the lead agency has jurisdiction over them. The Council on Environmental Quality's "Forty Questions" (no. 18) further explains this in the case of uncertainties regarding indirect effects:

1 - 7

> It will often be possible to consider the likely purchasers and the development trends in that area or similar areas in recent years; or the likelihood that the land will be used for an energy project, shopping center, subdivision, farm or factory. The agency has the responsibility to make an informed judgment, and to estimate future impacts on that basis, especially if trends are ascertainable or potential purchasers have made themselves known. The agency cannot ignore these uncertain, but probable, effects of its decisions.

1 – 7
See revised text under the *Direct and Indirect Impacts* section for each resource in Chapter 4 of this Final EIS. See also the revised text in the *Cumulative Effects* section of Chapter 4.

The DEIS (p. 2-2) states that the North Valleys Plan guides growth by recognizing critical conservation areas, establishing existing and future land use and transportation patterns, and identifying current and future public services and facility needs.

1 - 8

Recommendation: The FEIS should describe the indirect impacts to each resource which could result from the proposed project, including the accommodated future growth in the North Valleys and other affected parts of the project area. Resource-specific impacts (e.g., air emissions, stormwater and sanitary sewage disposal, vegetation and wildlife) that should be included in the FEIS are addressed in the sections below.

1 – 8
See Response 1-7.

Water Resources

EPA is concerned about the potential impacts of the project on surface water and groundwater quality and quantity in the service area. However, the DEIS does not sufficiently address impacts to these resources under either the proposed alternative (i.e., delivery of 11,500 acre-feet/year to the service area) or a scenario that involves delivery of up to 16,500 acre-feet/year (i.e., 13,000 acre-feet/year from FSR and 3,500 acre-feet/year from Dry Valley and Bedell Flat). Several of the cooperating agencies on this DEIS should have information regarding the potential impacts to water resources in the service area, as well as measures that could be implemented to mitigate adverse impacts.

1 - 9

Recommendation: The FEIS should describe and discuss how growth in the service areas will affect surface water and groundwater quality and quantity after build out. We recommend that BLM work with the appropriate local agencies to obtain information on the project's potential impacts to the following resources, and mitigation measures to avoid or minimize those impacts. The FEIS should address the following issues:

- Truckee River and Pyramid Lake water quality and quantity;

1 – 9
See Response 1-7. Also see revised Table 1-1 (Regulatory Responsibilities) in this Final EIS.

1 - 9

- Existing and future groundwater quality resulting from septic tanks and waste water treatment facilities in the North Valleys where project water will be distributed;
- Waste water treatment and discharge capacity and the impacts of waste water discharges on receiving waters, including domestic wells in the distribution areas;
- The transport and fate of stormwater and stormwater dissipation and discharge capacity in the service area.

We understand that Intermountain Water Supply's current water right in Dry Valley probably exceeds the sustainable yield there. In addition, the DEIS indicates that the potential impacts of the proposed action on springs, flowing wells, and riparian areas in the Honey Lake Valley and Smoke Creek Desert are unknown. The FEIS should include reasonable mitigation measures that can be implemented should groundwater in Honey Lake Valley, Smoke Creek Desert, Dry Valley or Bedell Flat be overdrawn. The DEIS indicates that monitoring will be ongoing to verify the groundwater modeling results. If impacts occur, one mitigation measure is to reduce the pumping rate in the production wells or pump intermittently to allow recovery (page 4-43). EPA does not believe this is a realistic or reliable measure once the water has been committed and/or delivered to North Valleys developments.

1 - 10

Recommendation: The FEIS should discuss whether this mitigation measure is practicable and the probability of it being implemented. The discussion should address how this measure could be implemented once the water has been committed and/or delivered to North Valleys developments. If non-pumping periods would be implemented, the FEIS and ROD should identify how long they could be, how they would be triggered, what the reasonable water levels would be for each well, how the water export amount would be guaranteed in light of the need to rest the wells, who would be responsible for replacing the water supply, and who would enforce non-pumping periods.

Another mitigation measure identified in the DEIS involves adding more production wells that would pump at lower rates to distribute groundwater drawdown over a larger area and reduce the magnitude of drawdown surrounding each well.

1 - 11

Recommendation: The FEIS should analyze scenarios using this measure to determine whether other impacts could result. For example, the FEIS should discuss whether phreatophytes would be affected over a larger area, as well as the probability of implementing this measure.

Another mitigation measure identified in the DEIS involves constructing water enhancement structures at spring or flowing well sites affected by groundwater drawdown. However, the potential impacts and benefits are not analyzed in the DEIS.

1 – 10

See new Appendix D (*Recommended Water Resources Monitoring and Management Plan*) as part of this Final EIS. Also see revised Table 1-1 (Regulatory Responsibilities) for a listing of agencies that have authority over the various permits associated with the proposed Projects.

1 – 11

See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) as part of this Final EIS. Potential impacts associated with implementation of mitigation measures that could be required by Washoe County or BLM for the pipeline rights-of-way are included in Chapter 4 of the Final EIS for each resource. Intermountain Water Supply has revised it's Proposed Action such that up to 2,000 af/yr would be pumped from five wells in Dry Valley (rather than 3,000 af/yr from two wells), and 500 af/yr would be pumped from two wells in Bedell Flat (rather than the same amount from one well). The groundwater flow model for Dry Valley has been revised and summarized in the Final EIS to describe the specified changes in pumping wells and total pumping rate (see *Water Resources* section in Chapter 4; see Appendix C in Final EIS). The groundwater model for Bedell Flat has not been changed because the addition of another production well near the first well would not have a substantial change to overall groundwater drawdown predicted in the basin using the model presented in the Draft EIS.

1 - 12 **Recommendation:** The FEIS should discuss how this measure could be accomplished without exacerbating the overdraught problem or reducing the volume that is contracted for export out of the basin. The FEIS and ROD should also identify who would be legally responsible for these measures, and who would enforce them.

According to the DEIS (p. 3-31), the Nevada State Engineer determined the safe yield of Bedell Flat groundwater basin to be 300 acre-feet per year and has granted 144 acre-feet per year to Intermountain Water Supply (IWS).

1 - 13 **Recommendation:** Given that 35 domestic wells already exist in Bedell Flat, the FEIS should identify the amount of water that is currently pumped in this basin. The FEIS should also describe how the project could change if the State Engineer does not grant IWS water rights beyond 144 acre-feet per year, including whether the project would continue to include the Bedell Flat well.

FSR has indicated its intent to discontinue irrigating its alfalfa fields when water is exported to the North Valleys. However, more information is needed in the FEIS regarding how this would be accomplished.

1 - 14 **Recommendation:** The FEIS should describe the timeline for transition from irrigation to water export. The FEIS and ROD should describe specific commitments made by FSR regarding this transition and identify how these commitments would be enforced.

It does not appear from the DEIS that the existing groundwater contamination at the Sierra Army Depot would be affected by extraction and export of 8,000 acre-feet/year in FSR. However, no information is provided regarding the potential impact of extraction and export of up to 13,000 acre-feet/year.

1 - 15 **Recommendation:** The FEIS should discuss how export of up to 13,000 acre-feet/year from FSR would affect the trichloroethylene (TCE) plumes at the Sierra Army Depot, as well as the Depot's existing and future efforts to contain, treat, and monitor the plumes. The FEIS should discuss any potential changes to FSR groundwater quality over time as a result of movement of the TCE plumes. The FEIS should include a map depicting the existing contaminant plumes and the predicted future plumes under the proposed alternative, no action, a no-effect threshold scenario, and a scenario in which FSR exercises all of its water right.

<u>Clean Water Act Section 404</u>

The DEIS indicates great uncertainty regarding the potential impacts to wetlands, riparian areas, flowing wells, and stream channels from the proposed project. Notwithstanding uncertainties in the groundwater models, the DEIS indicates the potential for substantial impacts

1 – 12

See Responses 1-10 and 1-11 above.

1 – 13

The Nevada State Engineer considers the existing domestic well status in each basin in deciding appropriation of water rights. Intermountain Water Supply is re-applying for a 356 af/yr water right to the State Engineer to add this amount to the approved 144 af/yr. Since 500 af/yr represents the Proposed Action for Intermountain Water Supply, potential impacts associated with pumping this amount of water are evaluated and disclosed in the EIS. Pumping water less than 500 af/yr would result in reduced impacts compared to those disclosed in the EIS.

1 – 14

The Fish Springs Ranch Conversion Plan (Walker & Associates 2003) is described in Chapter 2 of the Final EIS.

1 – 15

See Response 1-1. As described in the *Water Resources* section of Chapter 4, no effects are predicted on groundwater levels in the Sierra Army Depot area as a result of the Fish Springs Ranch pumping rate of 8,000 af/yr. Locations of groundwater contaminant plumes at the Depot are 5 to 6 miles west of the state-line, which are approximately 1 to 2 miles west of the maximum predicted extent of groundwater drawdown resulting from Fish Springs Ranch pumping at 8,000 af/yr. This discussion has been added to the *Water Resources* section of Chapter 4 in the Final EIS.

to springs and wetland habitat in the pumping basins. Twenty to 70 acres of riparian and wetland habitat associated with springs and flowing wells could be affected by the proposed project in the southern Smoke Creek Desert. However, these impacts have not been well quantified in the context of acres, functions, or values, and the DEIS does not sufficiently discuss the importance of these areas as wildlife or livestock watering areas in these arid basins.

1 - 16 **Recommendation:** The FEIS should quantify the acres, and describe in detail the values and functions of the streams, springs, riparian areas, and flowing wells in the project impact area. Waters of the U.S. should be identified. The FEIS should quantify and describe the potential impacts to these resources from the proposed project, including the 13,000 acre-feet/year export scenario. The FEIS should identify appropriate mitigation and estimate the environmental benefit of adopted mitigation measures.

The DEIS includes a map of the points at which the pipelines would cross stream channels. However, the DEIS does not provide a map that depicts waters of the U.S., including wetlands, in the project impact area. Information on these sensitive and important resources should be included in the FEIS. Some mitigation measures are identified in the DEIS. However, without sufficient detail on the potential impacts, it is unclear how well these measures will avoid, minimize, or compensate for losses.

1 - 17 **Recommendation:** The FEIS should include a map depicting all streams and wetlands in the project area. This map will be useful in depicting channel orientation vis a vis pipeline and road orientation for purposes of identifying potential impact areas and selecting alignments to minimize/avoid crossings.

1 - 18 **Recommendation:** The FEIS should quantify the acreages, values, and functions of waters of the U.S. in the service area that could be indirectly affected by the project as a result of induced growth there. The FEIS should identify appropriate mitigation and estimate the environmental benefit of adopted mitigation measures.

The DEIS does not discuss Clean Water Act Section 404 permitting or indicate whether the project will need an individual permit or qualifies for one or more authorizations under Nationwide Permit 12.

1 - 19 **Recommendation:** The FEIS should discuss coordination with the U.S. Army Corps of Engineers for Section 404 permitting and indicate whether the project will need an individual permit or qualifies for one or more authorizations under Nationwide Permit 12. The FEIS should discuss the permit requirements.

1 – 16

Table A-1 in Appendix A, and Table B-1 and the figure in Appendix B list the springs and wetland-type habitat areas that have been identified in the Project area. The *Water Resources* section of Chapter 4 also describes and quantifies potential impacts to springs and wetland habitat (see Tables 4-4, 4-6, and 4-8). See also Response 1-1. Any potential impacts to wetlands due to pumping are not under the jurisdiction of the U.S. Army Corps of Engineers via Section 404 of the Clean Water Act.

1 – 17

See Response 1-16.

1 – 18

Developers in the service area would be required to meet relevant regulations for wetlands and waters of the U.S. for any impacts associated with such development.

1 – 19

Fish Springs Ranch and Intermountain Water Supply are in the process of completing Section 404 permit applications for their respective projects. The U.S. Army Corps of Engineers has been consulted for the North Valleys Rights-of-Way Projects EIS. See Table 1-1 (Regulatory Responsibilities).

Air Quality

The DEIS does not analyze the indirect impacts the project would have on air quality in the service area or discuss whether the service area growth related to the project conforms with the State Implementation Plan (SIP).

I - 20 **Recommendation:** The FEIS should provide projected growth-related air emissions in the service area during and after build out under both the proposed project and a project in which both water exporters exercise their full water right, and discuss how that growth would conform with the SIP.

Increases in particulate air pollution have resulted in areas where irrigation was discontinued and crop cover is gone, and where groundwater drawdown has resulted in die off of natural vegetation. For example, BLM's 1993 Bedell Flat DEIS projected a maximum increase in PM10 (particulate matter smaller than ten microns) emissions of 14.4 micrograms per cubic meter in the Honey Lake area.

I - 21 **Recommendation:** The FEIS should describe and quantify the potential increased dust emissions in the Honey Lake Valley, Smoke Creek Desert, Fish Springs Ranch, Dry Valley, and Bedell Flat which could result from vegetation changes affected by irrigation modifications and groundwater drawdown with the proposed project, as well as if both exporters exercise their full water right. The FEIS should discuss measures to mitigate these effects, indicate their probability, and identify who would be responsible for implementing and enforcing them. The FEIS should estimate the environmental benefit of adopted mitigation measures.

The DEIS (p. 4-8) identifies a few general mitigation measures to reduce project air emissions and indicates that State of Nevada and Washoe County requirements will be implemented. The FEIS should include more specific mitigation measures for construction activities.

I - 22 **Recommendation:** The FEIS should identify mitigation measures for construction activities, including dust reduction measures in the applicants' Dust Control Plans that will be filed with the Washoe County District Health Department, Air Quality Management Division. At a minimum, we recommend the following measures be referenced in the FEIS and adopted in the ROD:

- Water active construction sites as needed, including nights, weekends, and holidays, and especially with windy conditions; or apply a non-toxic soil stabilizer;
- Vehicles hauling soil or other loose materials will be covered with tarp or other means;

I – 20
See revised text in the *Direct and Indirect Impacts* section and *Cumulative Effects* section of *Air Resources* of Chapter 4 in this Final EIS. As listed in Table 1-1 (Regulatory Responsibilities), the Washoe County District Health Department will issue an air quality permit for the North Valleys Rights-of-Way Projects, and for any activities by developers in the service area that would require a permit.

I – 21
A summary of the Fish Springs Ranch plan for ranch conversion has been added to the *Proposed Actions* section in Chapter 2 of this Final EIS.

I – 22
Construction activities and measures that would be implemented to control dust and reclaim disturbance areas are described in the *Proposed Actions* section of Chapter 2 in this Final EIS. Additional measures that could be required by Washoe County to control fugitive dust, traffic, and construction activities will be outlined in the Special Use Permits each applicant will need to secure.

- Cover or apply soil stabilizers to exposed stock piles;
- Use track-out elimination devices before entering paved public roads;
- I - 22 Wash or vacuum-sweep paved public road surfaces to remove visible track-out;
- Limit traffic speeds in the construction area and along access roads;
- Cover or apply soil stabilizers to disturbed areas within five days of completion of the activity at each site; and
- Reclaim and revegetate disturbed areas as soon as practicable after completion of activity at each site.

I - 23 **Recommendation:** BLM and the project applicants should develop and implement a plan complying with best practices for mitigating exhaust emissions from construction equipment. Some best practices are listed below. The FEIS should evaluate the feasibility of measures such as these to reduce construction emissions, referencing any which will be adopted in the ROD.

- Use particle traps and other appropriate controls to reduce emissions of diesel particulate matter (DPM) and other air pollutants. Traps control approximately 80 percent of DPM, and specialized catalytic converters (oxidation catalysts) control approximately 20 percent of DPM, 40 percent of carbon monoxide emissions, and 50 percent of hydrocarbon emissions;
- Use diesel fuel with a sulfur content of 500 parts per million or less, or other suitable alternative diesel fuel, substantially reducing DPM emissions;
- Visible emissions from all heavy duty off road diesel equipment should not exceed 20 percent opacity for more than three minutes in any hour of operation;
- Minimize construction-related trips of workers and equipment, including trucks and heavy equipment;
- Minimize construction equipment idling time by turning off engines when vehicles are stopped for more than a few minutes;
- Lease or buy newer, cleaner equipment (1996 or newer model);
- Employ periodic, unscheduled inspections to ensure that construction equipment is properly maintained at all times and does not unnecessarily idle, is tuned to manufacturer's specifications, and is not modified to increase horsepower except in accord with established specifications.

Biological Resources

The DEIS does not discuss the potential cumulative impacts to vegetation and wildlife from export of 13,000 acre-feet/year out of Honey Lake Valley. According to BLM's 1993 Bedell Flat DEIS, these impacts could be significant and adverse.

I - 24 **Recommendation:** The FEIS should describe and quantify these potential impacts, and identify monitoring and mitigation measures to avoid or minimize these impacts. Discuss

I - 23

Comment noted. Construction activity associated with pipeline installation will be a short-term project; therefore, emission sources associated with equipment and fugitive dust will be of short duration and the Projects would not represent long-term emission sources in the area.

I - 24

See Response I-1. See revised text in the *Direct and Indirect Impacts* section and *Cumulative Effects* section of *Water Resources, Vegetation Resource,* and *Wildlife Resources* in Chapter 4 of this Final EIS.

I - 24 the feasibility and probability of implementing these measures. The FEIS and ROD should identify all mitigation measures that would be required and specify who would implement and enforce them. The FEIS should estimate the environmental benefit of adopted mitigation measures.

The DEIS does not discuss the potential indirect and cumulative impacts of the proposed project on the vegetation and wildlife resources in the service area.

I - 25 **Recommendation:** The FEIS should describe and quantify the reasonably foreseeable future impacts to these resources in the service area. For example, the FEIS should address how many acres of vegetation and wildlife habitat would be modified in the North Valleys at build out, according to the Regional Plan and how wildlife would be affected. The FEIS and ROD should identify measures to mitigate these impacts (e.g., wildlife corridors and conservation areas) and specify who would be responsible for implementing them. The FEIS should estimate the environmental benefit of adopted mitigation measures.

1 – 25

See revised text under *Cumulative Effects* section for each resource in Chapter 4 of this Final EIS. Given the various zoning requirements that apply to the area encompassed by the North Valleys Area Plan, total acreage that could be converted from present day open range land (sagebrush, rabbit brush, and juniper) to residential streets, housing, urban landscape, and community infrastructure is not possible to accurately calculate. For purposes of this EIS, BLM assumes that the total number of possible residential housing units that could be served by delivery of 10,500 af/yr of water would be 14,500 units. Using the approximate acreage per residential unit identified in the North Valleys Plan of 0.58 acre/residence, a total of 8,410 acres could be converted to residential use.

Letter 2

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
WESTERN NEVADA AGENCY
311 East Washington Street
Carson City, NV 89701

IN REPLY REFER TO:
Real Property Management
(775) 887-3570
Draft EIS – North Valley's Rights-of-Way Projects

JUN 24 2005

Bureau of Land Management
Carson City Field Office
Attn: Terri Knutson, EIS Project Manager
5665 Morgan Mill Road
Carson City, Nevada 89701

Dear Ms. Knutson:

Thank you for the opportunity to review the draft EIS for the North Valleys Rights-of-Way Projects. Enclosed with this letter is a hard copy of Western Nevada Agency's comments, and a floppy disk with the comments in electronic format.

If there are questions concerning the comments, please feel free to contact Rita Suminski in this office.

Sincerely,

Robert Hunter

Superintendent

Enclosures (2)

North Valleys Rights-of-Way Projects Draft EIS
June, 2005

Review Comments

Cmt	Page	Para / Line	Commentor	Comment
1.	0	0	BIA	A caveat to the BIA's comments is needed. The BIA respects the water rights associated with and current use being made of water at Fish Springs as being a private matter. The BIA's comments are not directed at that general private ownership or use. The BIA's comments are directed at the potential for BLM's granting of a pipeline ROW that would facilitate the withdrawl of a large magnitude of water from Fish Springs and elsewhere that wouldn't occur if the ROW isn't granted. Comments are aimed at the potential for the BLM to grant permission to drill two wells on public land to convey groundwater that may fall under the Winter's Doctrine. The comments are directed at the impacts to Indian resources that would result from the action of granting of the ROW.
2.	3-52	Figure 3-7	BIA	2 – 1 NOTE: The map shows a portion of Pyramid Lake Paiute Reservation in the Smoke Creek Desert as supporting suitable habitat for the federally listed Carson wandering skipper. It is assumed that by using this term, the author is basing "suitable" on known habitat requirements of this skipper since no recovery plan has been written for the species nor has critical habitat been designated by the USFWS
3.	3-86/87	Ident. of Minority and Low Income Pops/Public Involve. and EJ	BIA	2 – 2 Pyramid Lake Paiute Tribe's Reservation is identified as having resources impacted by the proposed project. Every map included in the draft EIS shows a portion of this Tribe's reservation i.e. Figure 3-1 shows a portion of a watershed boundary lapping into Pyramid Lake Tribe's Reservation. For these reasons, Pyramid Lake Paiute Tribe should be included in the discussion of minority and low income populations. This comment has been made previously. Although Reno-Sparks Indian Colony may physically be totally located within the study area, it is Pyramid Lake that is being affected. It is hard to believe this Tribe would not have been " thought to have a potential interest" as per the stated criteria in this section. To leave them out as an identified entity is not correct. Please include this Tribe in this section of discussion.
4.	4-20	Paragraph 2 line 13 thru 15 and line 20 thru 21	BIA	2 – 3 The predicted drawdown of groundwater in wells and springs associated with the southern Smoke Creek Desert represents a negative impact to groundwater resources used and needed by the Pyramid Lake Paiute Tribe. This particular drawdown may represent impacts to Winter's Doctrine waters. For this reason, the BIA must object to the issuance of a ROW for the pipeline that would facilitate potential impacts to Winter's Doctrine waters.

2 – 1
The comment is correct.

2 – 2
See revised text in the *Environmental Justice* sections of Chapters 3 and 4 in this Final EIS.

2 – 3
Comment noted. Text has been added in this Final EIS, Chapter 3 – *Native American Religious Concerns/Indian Trust Responsibilities*.

	Cmt	Page	Para / Line	Commentor	Comment
2 – 4	5.	4-20	Paragraph 3 line 4	BIA	A potential impact to riparian and wetland vegetation has been identified from the predicted drawdown of groundwater in flowing wells and springs associated with the southern Smoke Creek Desert. Considering that riparian/wetland vegetation makes up only about 1% of any state or region's ecosystem, any reduction or loss of this type of vegetation is not acceptable. Unique plants occur in this habitat type that are part of Pyramid Lake Tribe's ecosystem and are needed to preserve cultural continuity. Any loss of riparian/wetland vegetation could result in a permanent loss of individual species and ecosystem function. Any impact to this vegetation would be a negative impact to Pyramid Lake Paiute Tribe and other Indian groups. The BIA objects to the issuance of a ROW that would result in any loss of riparian / wetland vegetation on Pyramid Lake Tribe's Trust land.
2 – 5	6.	4-24	Paragraph 2 Line 4	BIA	See comment #4. Comment applies to groundwater sources that could be affected the portion of Smoke Creek Desert immediately north of Sand Pass, and that portion of Pyramid Lake Valley east of Astor Pass.
2 – 6	7.	4-58	Paragraph 3 Line 2	BIA	Groundwater withdrawl could impact suitable wetland habitat for the federally listed species Carson Wandering Skipper that has "suitable" habitat located on Pyramid Lake Paiute Reservation as per figure 3-7. Any impact could reduce suitable habitat to unsuitable status. Loss of habitat for a federally listed species on Indian Trust land is not an acceptable situation. For this reason, the BIA must object to the issuance of a ROW for the pipeline that would facilitate these impacts and not be in compliance with federal law.
2 – 7	8.	4-61	Paragraph 2 Line 1	BIA	Since the federally listed Carson wandering skipper has designated suitable habitat and the EIS has identified reduction of groundwater / loss of wetland riparian at springs within this area, has or will the proponent consulted with the USFWS under Sec. 10 of the Endangered Species Act for impacts to this listed species habitat? And if there is a federal nexus on this project even though there are private proponents, has or will the BLM perform Sec. 7 consultation on the facilitated loss of this habitat with the USFWS? No mention was made of these consultations having been done or the result, nor was mention made of the potential for these consultations in the future. For this reason, the BIA must object to the issuance of a ROW for the pipeline that would facilitate the possible violation of Endangered Species Act. It appears that ESA process has not been followed and an un-consulted, un-mitigated, negative impact to a federally listed species habitat located on Indian Trust land could result.
2 – 8	9.	4-91	Paragraph 3 Line 2	BIA	It is stated there would be no residual effects to .../ Indian Trust responsibilities resulting from implementation of the Proposed Actions and Alternatives. The BLM's Trust responsibilities go beyond mere consultation to satisfy Sec. 106 of NHPA. These extend also to potentially protecting physical assets of Indian Trust lands. The BIA must object to the issuance of a ROW for the pipeline that would facilitate the predicted groundwater drawdown of Pyramid Lake Tribe's waters, the potential loss of wetland/riparian vegetation for a minimum of the long-term, and possible process violation of the Endangered Species Act Sec. 10 or 7.
2 – 9	10.	4-94	Paragraph 5 Proposed Granite Fox Power Plant	BIA	Although disclosure of the potential cumulative effect of North Valley and Granite Fox water withdrawl from certain areas is needed, there is no way to predict the scope or impact of the second project at this timet. Because there are several unacceptable potential impacts from the proposed North Valleys project, the BIA would strenuously object to any other project that would exacerbate the impacts to resources located on Indian Trust land or non-reservation resources that were protected under treaty rights .
	11.				

2 – 4
Comment noted.

2 – 5
Comment noted.

2 – 6
Comment noted.

2 – 7
BLM has determined that the potential impacts associated with the installation and operation of the proposed pipelines across public land would not adversely affect threatened and endangered species in the Projects Areas. As such, BLM has determined that no formal Section 7 consultation is necessary for the Rights-of-Way projects; however Section 10 consultation may be necessary as determined by USFWS.

2 – 8
Comment noted. See Response 2-7.

2 – 9
Comment noted.
.

Letter 3

PYRAMID LAKE WATER RESOURCES
P.O. BOX 256
NIXON, NEVADA 89424
(775) 574-1050

July 19, 2005

Terri Knutson
EIS Project Manager
Bureau of Land Management
Carson City Field Office
5665 Morgan Mill Road
Carson City, Nevada 89701

RE: North Valleys Rights-of-Way Projects, Environmental Impact Statement

Dear Ms. Knutson,

The Pyramid Lake Paiute Tribe respectfully submits these comments on the North Valleys Rights-of-Way Projects, Environmental Impact Statement. The proposed Projects, Fish Springs Ranch and Intermountain Water Supply, will have a detrimental effect on Tribal Resources on the north end of the reservation by pumping groundwater from the area. Comments on the technical aspects of the groundwater impacts are being submitted by Stetson Engineers. Transferring the water out of the basin will impact tribal resources such as springs, seeps, wildlife and vegetation by potentially degrading water quality and reducing water quantity. The Tribe is also concerned with the surrounding cultural resources.

The Groundwater models show the potential for drawdown in the Astor Pass and Sand Pass water table. The reduction of water results in low flows and as the water table recedes riparian/wetlands areas deteriorate due to the lack of water in the root zone. Flow reductions in the Smoke Creek southern springs may adversely affect 20-70 acres of riparian/wetlands when the water table is lowered below the rooting depth by the proposed pumping. Recovery of the wetland habitat will take many years to repair depending upon the severity. The proposed project will further impact the Sage Grouse, which is already been diminished by fires. They need the sagebrush habitat and riparian

3 - 1 areas for brooding. Why were the impacts to this species marginalized? There was no
study on the affect the project will have on the amphibian population. The Tribe has
been working to restore the leopard frog habitat on the reservation lands. There has not
been any leopard frogs found in the springs/seeps in the north end of the reservation, but
a baseline study of the native populations need to be included in the EIS. Since they are a
3 - 2 good indicator species, why were amphibian populations excluded in the EIS? Macro-
invertebrate bioassessment should be included in the Final EIS. Macro-invertebrates
sustain aquatic populations and are good indicators of water quality. Preservation of
diverse macro-invertebrate species prevents degradation of aquatic habitat. Many metal
analyses are near the detection limit and bioassessment is a good measure of surface
3 - 3 water contamination. Will bioassessments be done on any of the surface water impacted
by the proposed project? Is the Habitat Conservation Plan available for review before the
Final EIS is issued?

Water quality of springs and seeps are degraded as water is pumped from the basin. Poor
quality ground water will move from portions of the ground water system that is not
associated with the surface water to areas where ground water discharges to surface
water. (4-12) The EIS states that there will be "minor" increases in the TDS, however
with a high evaporation rate in the area, salts will accumulate on the soils and plants.
What measures will be taken to prevent the accumulation of salt so the plants are not
3 - 4 stressed and the springs/seeps remain palatable to the wildlife? The salts will stunt
growth, inhibit reproduction, and deposit salt on the plant surface. The plants and water
become too salty for animals to use. What mitigation measures will be implemented to
prevent degradation of water quality by elevated TDS in these springs/seeps so the
wildlife in the area are not affected?

The TDS is not the only potential for surface water contamination from groundwater
connections. Sierra Army Depot contamination is a threat to water quality as there are
plumes of organic solvents, metals, and explosive by-products that have been exploded
and burned on the site for many years. Regional pumping at Herlong and Honey Lake
"may effect ground water flow direction at the Sierra Army Depot."(4-19) This
movement in the ground water and changes in the flow patterns will transport
contaminates to other parts of the ground water system. It may not interfere with the
current clean-up on site at the Sierra Army Depot but pumping on the reservation or other
areas in the region will transport contaminate into the surrounding environment, or
through a surface water connection. This process will have an impact on tribal resources
and was excluded from the EIS discussion. Will monitoring be done to detect migration
3 - 5 of contaminates from the Sierra Army Depot? Will the Production well be sampled
quarterly and required to comply with Safe Drinking Water Act and other applicable
regulations protecting wildlife?

There were two other sources of regional ground water contamination mentioned in the document, but not incorporated in the water quality discussion. (3-77) This section,

3 – 1

The BLM action addressed in the EIS is the review of proposed rights-of-way applications for facilities on public land administered by BLM. Installation of water transmission pipelines and associated facilities on public land would have short-term impacts on sage grouse habitat during the construction phases of the projects. Potential impacts to riparian vegetation would occur where water transmission pipelines cross perennial and ephemeral streams; however, these areas of disturbance would be localized, short-term, and would be revegetated. The proposed pipeline infrastructure and facilities constructed on public land would not affect springs/seeps that may support riparian habitat for sage grouse brood rearing. The small amounts of riparian habitat that could be affected by construction activities would not diminish the long-term capacity of the project area to support sage grouse. Potential impacts to springs and seeps from the proposed Projects have been described in the EIS. See Chapter 4 – Water Resources.

3 – 2

Amphibian studies were not conducted because the Proposed Actions (construction of water transmission pipelines and associated facilities on public land) would have minimal effects on amphibian habitat. Small areas of amphibian habitat that would be removed as a result of construction of pipelines and other facilities across perennial and ephemeral drainages would not likely affect the capacity of the project area to support viable populations of amphibians.

3 – 3

The Proposed Actions may increase sediment delivery as a result of pipeline construction across perennial and ephemeral drainages. These potential impacts to water quality and aquatic invertebrates would be short-term (during construction) and localized. Under current conditions, perennial and ephemeral drainages have high levels of suspended sediment during periods of runoff following snow melt and rain events. The Proposed Actions would not increase sediment levels over existing conditions characterized by periodic scouring and flooding.

3 - 4

The occurrence of salt or saline water is limited to areas of the Honey Lake Valley where a playa lake has formed and periodic wetting and drying results in formation and concentration of salt and other constituents. The potential for salt from this source to become dissolved and transported to the deeper groundwater aquifer (aquifer that would support water production for the proposed Fish Springs Ranch production wells) is not anticipated because of the lack of connection between the surface playa lake and aquifer. In addition, since groundwater would flow towards the pumping wells, springs and seeps would not be affected by any constituents contained in groundwater that is reporting to the pumping wells. See also the *Recommended Water Resources Monitoring and Management Plan* in new Appendix D of this Final EIS.

3 – 5

The Fish Springs Ranch monitoring program associated with construction and operation of the water transmission pipeline and associated facilities is described in Chapter 2 – Proposed Actions. See also Appendix D - *Recommended Water Resources Monitoring and Management Plan.*

3 - 6

Historical Overview, contains a discussion of Mining activities. The Pyramid District and the north end of the reservation have historic mining sites that consist of fractured metal deposits some of which are acid generating. There are sites that have underground workings where the fractured rock can be a direct conduit to the ground water. Contamination from these sites were not mentioned or sampled in the EIS. Metals such as Selenium, Manganese, Copper, and Silver can be very toxic to avian and aquatic species. The discovery of Uranium in the area should have prompted its analysis in the spring and well samples. The geothermal areas also have the potential for metals and mercury in the ground water that will migrate through the ground water system. (3-18) JBR 1989 sampled springs and did laboratory analysis on "common ions". What were the ions and their concentration? Analysis of toxic metals to aquatic and avian species should be done on monitoring wells to have background concentrations before the Final EIS is released. Will the monitoring plan track the movement of these metals during the life of the pumping project?

3 – 6
The Pyramid Mining District is located at the north end of the Reservation and, as such, groundwater in the vicinity of the district would likely flow toward Smoke Creek Desert and/or Pyramid Lake Valley. The district lies outside of the projected groundwater drawdown area associated with groundwater modeling for the Fish Springs Ranch production wells. Appendix E contains results of groundwater samples collected and analyzed in June 2005 from the Fish Springs Ranch wells. Uranium and other metals are included in the extensive list of parameters that were analyzed. Groundwater monitoring would continue during the life of operations (see *Recommended Water Resources Monitoring and Management Plan* in Appendix D of this Final EIS).

3 - 7

The lower water table also potentially impacts air quality since the drying riparian/wetland areas will be more susceptible to the effects of wind erosion. In addition, the conversion of agricultural fields at Fish Springs Ranch to municipal and industrial water sources requires mitigation measures for fugitive dust. The resultant cumulative impacts of increased particulate matter negatively affect visibility, a resource important to the Tribe's recreational value.

3 – 7
The Conversion Plan for Fish Springs Ranch is described in this Final EIS, Chapter 2 – *Proposed Actions*.

3 - 8

The Pyramid Lake Paiute Tribe was not included as a cooperating agency so the cultural survey and site assessment was not reviewed by the tribe. The cultural documents need to be available for tribal review to determine if the project area includes traditional sites important to the Northern Paiute People, and specifically to the Pyramid Lake Paiute People. There are cultural sites in the EIS that were unevaluated before the draft was completed. Why was this done? How can the Tribe assess impacts at these sites or know if proper mitigation measures are being proposed, especially when the evaluation is incomplete or missing? All of our tribal concerns and impacts to resources must be properly analyzed, mitigated and resolved before the Final EIS is issued. This will assure the Tribe and satisfy your agency's trust responsibility. It is expected that Tribal concerns will be addressed before the Final EIS is distributed. We appreciate your time and attention in this very important matter.

3 – 8
The Paiute Tribe has been included as a cooperating agency from the beginning of the EIS process. BLM submitted a letter to the Pyramid Lake Paiute Tribe containing excerpts from the cultural survey report on July 20, 2005. A Record of Decision will not be issued until BLM consultation with Paiute Tribe is complete.

Sincerely,

John W. Jackson
Director Department of Water Resources
Pyramid Lake Paiute Tribe

Letter 4

STETSON ENGINEERS INC.

2171 E. Francisco Blvd., Suite K San Rafael, California 94901 (415) 457-0701
FAX: (415) 457-1638 email: sr@stetsonengineers.com

3104 East Garvey Avenue, Suite A West Covina, California 91791 (626) 967-6202
FAX: (626) 331-7065 email: wc@stetsonengineers.com

2659 W. Guadalupe Rd., Suite D213 Mesa, Arizona 91791 (480) 839-5910
FAX: (480) 839-6560 email: mesa@stetsonengineers.com

SERVING CLIENTS SINCE 1957

VIA FAX: (775) 885-6147 AND
EMAIL: nvalleyswater_eis@blm.gov

1336 July 25, 2005 San Rafael

Bureau of Land Management
Carson City Field Office
Attn: Terri Knutson, EIS Project Manager
5665 Morgan Mill Road
Carson City, Nevada 89701

Re: Draft EIS – North Valleys Rights-of-Way Project

Dear Ms. Knutson:

In the bottom paragraph on page two of our letter dated July 20, 2005, the word "surface" should be corrected to "subsurface." Attached is the July 20, 2005 letter with the correction.

Thank you for your cooperation in this matter.

Sincerely,

Oliver S. Page

Oliver S. Page
for Ali Shahroody
Stetson Engineers, Inc.

Attachment

cc: Norm Harry
Randy Tobey
John Jackson
Robert Pelcyger

STETSON ENGINEERS INC.

2171 E. Francisco Blvd., Suite K San Rafael, California 94901 (415) 457-0701
FAX: (415) 457-1638 email: sr@stetsonengineers.com

3104 East Garvey Avenue, Suite A West Covina, California 91791 (626) 967-6202
FAX: (626) 331-7065 email: wc@stetsonengineers.com

2659 W. Guadalupe Rd., Suite D213 Mesa, Arizona 91791 (480) 839-5910
FAX: (480) 839-6560 email: mesa@stetsonengineers.com

SERVING CLIENTS SINCE 1957

VIA FAX: (775) 885-6147 AND
EMAIL: nvalleyswater_eis@blm.gov

1336 July 20, 2005 San Rafael

Bureau of Land Management
Carson City Field Office
Attn: Terri Knutson, EIS Project Manager
5665 Morgan Mill Road
Carson City, Nevada 89701

Re: Draft EIS – North Valleys Rights-of-Way Projects

Dear Ms. Knutson:

The following comments are provided on behalf of the Pyramid Lake Paiute Tribe. We have reviewed the Draft Environmental Impact Statement (DEIS) on the North Valleys Rights-of-Way Projects dated May 2005. We concur with the findings in the DEIS of impacts on the Pyramid Lake basin and the portion of Smoke Creek basin within the Pyramid Lake Indian Reservation resulting from the exportation of 8,000 acre-feet of pumped water from the Honey Lake basin by Fish Springs Ranch, LLC. The proposed transbasin water exportation will result in reducing water supply (groundwater flow) to the Pyramid Lake basin and Smoke Creek basin through Astor Pass and Sand Pass, respectively.

According to the DEIS, the groundwater table could be lowered up to 15 feet in the Sand Pass area including the portion of Smoke Creek basin immediately north of the pass within the Reservation and the Astor Pass area including the portion of Pyramid Lake basin immediately east of the pass (DEIS, p. 4-24). This will increase the cost of pumping for irrigation in those areas.

The reduction in groundwater supply and increased depth of pumping will affect the practicably irrigable acreage (PIA) in the area of Astor Pass and Smoke Creek basin within the Reservation. As stated in the DEIS (p. 4-10 and 4-11), any reductions of water supply within Pyramid Lake Paiute Tribal land as a result of the proposed pumping in the Honey Lake basin will infringe upon Winter's Doctrine water rights held by the Tribe.

4 - 1 Based on the model analysis by Lahontan Geoscience, the proposed pumping of 8,000 acre-feet per year at Fish Springs Ranch will reduce the groundwater flow to the Pyramid Lake basin by about 150 acre-feet per year, directly affecting the Tribe's resources. Similarly, the reduction in the groundwater flow to the Smoke Creek basin via Sand Pass will be 570 acre-feet per year (DEIS, p. 4-15 and 4-16). The U.S. Bureau of Land Management has the responsibility to protect Tribe's trust resources in granting rights-of-ways for the proposed project.

4 - 2 In 2003, Stetson Engineers asked Lahontan Geoscience to undertake sensitivity analyses, including changes to hydraulic conductivity, ET extinction depth and mountain front recharge in the Honey Lake basin. The Tribe is concerned that the mountain front recharge in the south eastern portion of Honey Lake basin is overstated. The sensitivity analysis indicates that a reduction of recharge in the Virginia Mountains by 25 percent would result in decreased groundwater flow toward Pyramid Lake and Smoke Creek basin by about 1,315 acre-feet per year instead of 720 acre-feet per year shown in the DEIS.

4 - 3 The DEIS tries to compare the reduction in groundwater flow through Astor Pass to natural recharge in the Pyramid Lake basin or Truckee River inflow to Pyramid Lake. The DEIS makes a similar comparison for the reduction in groundwater flow through Sand Pass to natural recharge in the Smoke Creek basin (DEIS, p. 4-16). These types of comparisons are irrelevant and they should be deleted from the document.

As indicated in the DEIS, the proposed pumping at Fish Spring Ranch will adversely affect the groundwater quality in Astor Pass and reduce the flow or dry up springs in the Smoke Creek basin portion of the Reservation. Additionally, there will be a reduction of about 500 acre-feet per year in subsurface flow from the Smoke Creek basin to Pyramid Lake.

Thank you for the opportunity to provide comments.

Sincerely,

Oliver S. Page

Oliver S. Page
for Ali Shahroody
Stetson Engineers, Inc.

cc: Norm Harry
Randy Tobey
John Jackson
Robert Pelcyger

AS/rrk

4 – 1
Comment noted.

4 – 2
Recharge estimates used in the groundwater flow model for Fish Springs Ranch are similar to those used by the U.S. Geological Survey (Handman et al., 1990). USGS estimated about 4,200 af/yr recharge would occur from precipitation in eastern Honey Lake Valley, plus 5,600 af/yr as groundwater underflow in the southeastern corner of the valley from the Virginia Mountains area. Therefore, total recharge from precipitation essentially is 9,800 af/yr. For the updated 2005 groundwater flow model, a reduced combined recharge rate of 8,411 af/yr was used to represent direct infiltration of precipitation into the model area for eastern Honey Lake Valley.

4 – 3
Comment noted.

KENNY C. GUINN
Governor

JOHN P. COMEAUX
Director

STATE OF NEVADA

2005 JUL 15 A 11:03

RECEIVED
BUREAU OF LAND MGMT
CARSON CITY
FIELD OFFICE

DEPARTMENT OF ADMINISTRATION

209 E. Musser Street, Room 200
Carson City, Nevada 89701-4298
Fax (775) 684-0260
(775) 684-0213

July 13, 2005

Terri Knutson
Bureau of Land Management
Carson Ciy Field Office
5665 Morgan Mill Road
Carson City, NV 89701

Re: SAI NV # **E2005-292** Reference **NV030**

Project: **Draft EIS North Valleys Rights-of-Way Projects**

Dear Terri Knutson:

Enclosed are additonal comments from the following agencies regarding the above referenced document:

Division of Water Resources
State Health Division

These comments were received after our previous letter to you. Please incorporate these comments into your decision making process. If you have questions, please contact me at (775) 684-0209.

Sincerely,

Kimberley Perondi

Kimberley Perondi
Nevada State Clearinghouse Coordinator/SPOC

Enclosure

Letter 5

Kimberly Perondi

From: Sue Gilbert
Sent: Monday, July 11, 2005 4:30 PM
To: Kimberly Perondi
Subject: E2005-292

-----Original Message-----
From: Kim Perondi [mailto:kperondi@budget.state.nv.us]
Sent: Tuesday, May 31, 2005 5:10 PM
To: Robert K. Martinez
Subject: E2005-292 Draft EIS North Valleys Rights-of-Way Projects - Carson Ciy Field Office

NEVADA STATE CLEARINGHOUSE
Department of Administration, Budget and Planning Division
209 East Musser Street, Room 200, Carson City, Nevada 89701-4298
(775) 684-0209 Fax (775) 684-0260
DATE: May 31, 2005

Division of Water Resources

Nevada SAI # E2005-292
Project: Draft EIS North Valleys Rights-of-Way Projects

Follow the link below to download an Adobe PDF document concerning the above-mentioned project for your review and comment.

http://budget.state.nv.us/clearinghouse/Notice/2005/E2005-292.pdf

Please evaluate it with respect to its effect on your plans and programs; the importance of its contribution to state and/or local areawide goals and objectives; and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than Monday, July 18, 2005.

Use the space below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference. Questions? Kim Perondi, Clearinghouse Coordinator, (775) 684-0209 or kperondi@budget.state.nv.us.

____No comment on this project ____Proposal supported as written

5 – 1 AGENCY COMMENTS: All waters of the State belong to the public and may be appropriated for beneficial use pursuant to the provisions under Chapters 533 and 534 of the Nevada Revised Statutes (NRS), and not otherwise. Any water developments constructed and utilized for a beneficial use whether surface or underground must be done so incompliance with the referenced chapters of the NRS.

Signature: Rob Martinez Date: 7/11/2005

___
Distribution:
Audra Blackwell, Department of Conservation & Natural Resources Sandi Quilici,

7/12/2005

5 – 1
Comment noted.

Letter 6

-----Original Message-----
From: Stan R. Marshall
Sent: Wednesday, June 01, 2005 9:57 AM
To: Pamela M. Glass
Cc: Carol A. Whaley
Subject: FW: E2005-292 Draft EIS North Valleys Rights-of-Way Projects - Carson Ciy Field Office

FYI and D.
Thanks,
Stan

-----Original Message-----
From: Kim Perondi [mailto:kperondi@budget.state.nv.us]
Sent: Tuesday, May 31, 2005 5:01 PM
To: Stan R. Marshall
Subject: E2005-292 Draft EIS North Valleys Rights-of-Way Projects - Carson Ciy Field Office

NEVADA STATE CLEARINGHOUSE
Department of Administration, Budget and Planning Division
209 East Musser Street, Room 200, Carson City, Nevada 89701-4298
(775) 684-0209 Fax (775) 684-0260
DATE: May 31, 2005

State Health Division

Nevada SAI # E2005-292
Project: Draft EIS North Valleys Rights-of-Way Projects

WA-2078-05

Follow the link below to download an Adobe PDF document concerning the above-mentioned project for your review and comment.

http://budget.state.nv.us/clearinghouse/Notice/2005/E2005-292.pdf

Please evaluate it with respect to its effect on your plans and programs; the importance of its contribution to state and/or local areawide goals and objectives; and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than Saturday, June 18, 2005.

Use the space below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference. Questions? Kim Perondi, Clearinghouse Coordinator, (775) 684-0209 or kperondi@budget.state.nv.us.

____No comment on this project   X Proposal supported as written

AGENCY COMMENTS:
6 – 1 Any proposed water projects must be submitted to Washoe County Health Division for review and approval prior to construction.

Signature: [signature], Chief, BHPS, Nevada State Health Division   Date: 6-21-05

6 – 1
Comment noted.

KENNY C. GUINN
Governor

JOHN P. COMEAUX
Director

STATE OF NEVADA

DEPARTMENT OF ADMINISTRATION
209 E. Musser Street, Room 200
Carson City, Nevada 89701-4298
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(775) 684-0213

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CARSON CITY
FIELD OFFICE

June 20, 2005

Terri Knutson
Bureau of Land Management
Carson Ciy Field Office
5665 Morgan Mill Road
Carson City, NV 89701

Re: SAI NV # **E2005-292** Reference: **NV030**

Project: **Draft EIS North Valleys Rights-of-Way Projects**

Dear Terri Knutson:

Enclosed are the comments from the following agencies regarding the above referenced document:

Department of Transportation
Division of State Lands
Public Utilities Commission

These comments constitute the State Clearinghouse review of this proposal as per Executive Order 12372. Please address these comments or concerns in your final decision. If you have questions, please contact me at (775) 684-0209.

Sincerely,

FOR
Kimberley Perondi
Nevada State Clearinghouse Coordinator/SPOC

Letter 7

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
1263 S. Stewart Street
Carson City, Nevada 89712

KENNY C. GUINN
Governor

June 10, 2005

JEFFREY FONTAINE, P.E., *Director*

In Reply Refer to:

PSD 7.01

RECEIVED
JUN 13 2005
DEPARTMENT OF ADMINISTRATION
OFFICE OF THE DIRECTOR
BUDGET AND PLANNING DIVISION

Ms. Kim Perondi
Department of Administration
Budget and Planning
209 East Musser Street Room 200
Carson City NV 89701

Dear Ms. ~~Perondi~~; Kim

I am writing this letter in response to your request for comments on the Draft EIS North Valleys Rights-of-Way Projects (E2005-292).

7 - 1 Developing this water system would seem to lead to more development. The NEPA document, therefore, needs to address the infrastructure required to supply this development, at least as secondary and cumulative impacts.

If you have any questions, please do not hesitate to contact me at (775) 888-7240.

Sincerely,

Kent Cooper
Assistant Director of Planning

cc: Thor Dyson, District Engineer

KC: cc

7 – 1
Comment noted.

Letter 8

Skip Canfield

RECEIVED
JUN 1 6 2005
DEPARTMENT OF ADMINISTRATION
OFFICE OF THE DIRECTOR
BUDGET AND PLANNING DIVISION

From: Sandy Quilici
Sent: Wednesday, June 01, 2005 8:25 AM
To: Skip Canfield
Subject: FW: E2005-292 Draft EIS North Valleys Rights-of-Way Projects - Carson Ciy Field Office

-----Original Message-----
From: Kim Perondi [mailto:kperondi@budget.state.nv.us]
Sent: Tuesday, May 31, 2005 5:01 PM
To: Sandy Quilici
Subject: E2005-292 Draft EIS North Valleys Rights-of-Way Projects - Carson Ciy Field Office

NEVADA STATE CLEARINGHOUSE
Department of Administration, Budget and Planning Division
209 East Musser Street, Room 200, Carson City, Nevada 89701-4298
(775) 684-0209 Fax (775) 684-0260
DATE: May 31, 2005

Department of Conservation & Natural Resources

Nevada SAI # E2005-292
Project: Draft EIS North Valleys Rights-of-Way Projects

Follow the link below to download an Adobe PDF document concerning the above-mentioned project for your review and comment.

http://budget.state.nv.us/clearinghouse/Notice/2005/E2005-292.pdf

Please evaluate it with respect to its effect on your plans and programs; the importance of its contribution to state and/or local areawide goals and objectives; and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than Saturday, June 18, 2005.

Use the space below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference. Questions? Kim Perondi, Clearinghouse Coordinator, (775) 684-0209 or kperondi@budget.state.nv.us.

8 – 1 ____No comment on this project ____Proposal supported as written

AGENCY COMMENTS: DEFER TO WASHOE COUNTY LOCAL JURISDICTION COMMENTS AND STATE ENGINEER

Signature: [signature] Date: 6/15/05

Distribution:
Audra Blackwell, Department of Conservation & Natural Resources Sandi Quilici, Department of Conservation & Natural Resources Crystal Simon, Division of Emergency Management Skip Canfield, AICP, Division of State Lands Sandi Gotta, Division of Conservation Districts John Walker, Division of Environmental Protection Catherine Cuccaro, Department of Transportation David Pulliman, Department of Wildlife, Director's Office Roy Leach, Department of Wildlife, Fallon Robert Martinez, Division of Water Resources James D. Morefield, Natural Heritage Program Brad Eckert, Division of State Parks Mark Harris, PE, Public Utilities Commission Rebecca Palmer, State Historic Preservation Office John

8 – 1
Comment noted.

Letter 9

Subject: FW: E2005-290 Draft EIS North Valleys Rights-of-Way Projects
From: "Kimberly Perondi" <kperondi@budget.state.nv.us>
Date: Mon, 20 Jun 2005 09:57:11 -0700
To: "Reese Tietje" <rtietje@budget.state.nv.us>

From: Mark Clarkson [mailto:mclarkson@puc.state.nv.us]
Sent: Fri 6/17/2005 8:41 AM
To: Kimberly Perondi
Subject: E2005-~~290~~ 292 Draft EIS North Valleys Rights-of-Way Projects

Hello Kim!

9 – 1 I am providing comments on the subject projects. The Public Utilities Commission will require these projects to submit an application for a Utilities Environmental Protection Act permit (UEPA). The projects will need Commission authorization prior to commencing work. The permit is required per NRS 704.820 through NRS 704.900 and NAC 703.415 through NAC 703.427.

Thank-you.

-- Clarkson

9 – 1
Comment noted.

Letter 10

WASHOE COUNTY NEVADA

Community Development

"Dedicated to Excellence in Public Service"
Adrian P. Freund, AICP, Community Development Director

2005 JUL 18

July 14, 2005

RECEIVED BUREAU OF LAND MANAGEMENT CARSON CITY FIELD OFFICE

Terri Knutson, EIS Project Manager
Bureau of Land Management
Carson City Field Office
5665 Morgan Mill Road
Carson City, NV 89701

RE: Review and Comment on the Adequacy and Accuracy of the Draft Environmental Impact Statement for the *North Valleys Rights-of-Way Projects*.

Dear Ms. Knutson,

Washoe County, in accordance with its status as a cooperating agency, has completed its review of the Draft Environmental Impact Statement for the *North Valleys Rights-of-Way Projects*. The Washoe County Planning Commission reviewed and commented on the Draft EIS at its regular meeting on June 21, 2005 and the Washoe County Board of County Commissioners did the same on July 12, 2005. Please find attached, for consideration in the Final Environmental Impact statement, a cumulative body of comments from this review and analysis.

Should you have any questions, or require clarification regarding the attached comments, please do not hesitate to contact Bill Whitney, at 775-328-3617. Thank you for the opportunity to comment.

Adrian P. Freund, AICP
Community Development Director

APF/bw

cc: Michelle Poche, Assistant County Manager
Mike Harper, FAICP, Advanced Planning Manager

Post Office Box 11130, Reno, NV 89520-0027 – 1001 E. Ninth St., Reno, NV 89512
Telephone: 775.328.3600 – Fax: 775.328.3648
www.washoecounty.us/comdev/
"Your Community Development Department"

ATTACHMENT

Washoe County Comments On:

Draft Environmental Impact Statement – North Valleys Rights-of-Way Projects

Washoe County Planning Commission – June 21, 2005
Washoe County Commission – July 12, 2005

10 - 1

1) (Pg. 2-14, ¶4) The text in this paragraph should be consistent with the pipeline construction section for Fish Springs Ranch on page 2-29. "No construction activities would occur when surface conditions on the right-of-way or access roads are too wet to adequately support construction equipment."

10 - 2

2) (Pg. 2-27, ¶4) To be consistent in public health considerations, this section should contain the same text that is included for the Fish Springs Ranch production wells on page 2-4. "Production wells would be gravel packed, constructed with sanitary seals to a depth 100 feet below ground surface, and equipped with water lubricated vertical turbine pumps."

10 - 3

3) (Pg. 2-31, ¶2) The entire section on Fire Prevention should also be included in the Fish Springs Ranch proposal.

10 - 4

4) (Pg. 3-23, ¶2) The Nevada State Engineer determined in 1991 that the perennial or "safe yield" of eastern Honey Lake Valley was 13,000 af/yr. The text in this section cites a 1992 study that says this is an over estimate of perennial yield. This section should also list any studies done since 1991 that support the State Engineer's figure of safe yield.

10 - 5

5) (Pg. 3-57, ¶6) The entire text describing the "Planned Unit Development" at the Reno-Stead Airport is outdated. The City of Reno changed the airports land to straight industrial zoning over the entire property. Subsequently, the Airport has been working to develop a Regional Center Plan Overlay District, with mixed-use zoning.

10 - 6

6) (Pg. 4-43, ¶4) The mitigation measures outlined in this section need to be written more definitively. Both occurrences of "could" in this paragraph should be changed to "should". The phrase "significant impacts to any private/public wells, and/or springs" needs to be defined as to what constitutes "significant". Details need to be included, spelling out which entity will be responsible for the periodic water level measurements, etc.

10 - 7

7) (Pg. 4-44, ¶3&4) The monitoring measures outlined in this section need to be written more definitively. Both occurrences of "could" in these paragraphs should be changed to "should". Both paragraphs are describing monitoring measures and there should be mitigation measures associated with these for the Fish Springs Ranch project just like there is for the Intermountain project on 4-45, ¶1.

10 – 1
Descriptions of the Proposed Actions contained in Chapter 2 are summarizations of the proponent's projects. Information provided in the Proposed Actions section does not necessarily reflect BLM requirements for rights-of-way applications.

10 – 2
See Response 10-1.

10 – 3
See Response 10-1.

10 – 4
The Nevada Supreme Court affirmed the ruling of the Nevada State Engineer regarding the water right issued to Fish Springs Ranch. The case was not appealed and it is the law of Nevada and binding to all parties to the action. This information has been added to Chapter 2 in the Final EIS.

10 – 5
See revised text in Chapter 3 of the Final EIS regarding the description of Planned Unit Development.

10 – 6
Mitigation measures associated with construction and operation of the water transmission pipeline and associated facilities are revised and included in Chapter 2 of the Final EIS. See Appendix D – *Recommended Water Resource Monitoring and Management Plan*, which includes monitoring for groundwater levels and quality; flow and quality of springs, and characteristics of riparian areas.

10 – 7
See Response 10-6.

10 - 8

8) (Pg. 4-45, ¶2) Monitoring measures are outlined for declining groundwater quantity affecting domestic wells in the southern portion of Bedell Flat. Mitigation measures need to also be included, as they are for Dry Valley in the preceding paragraph.

10 – 8
See Response 10-6.

10 - 9

9) (Pg. 4-52, ¶1) The occurrence of "shallow unconfined groundwater" should be analyzed and the results included in the DEIS, so conclusions could be drawn on any potential adverse effects to wetland or other vegetation in the Smoke Creek Desert.

10 – 9
Wells completed in the Sand Pass area near Smoke Creek Desert do not indicate presence of shallow unconfined groundwater; however, such conditions may occur closer to the springs and riparian areas. The text has been revised in the Final EIS. These areas are included in the *Recommended Water Resources Monitoring and Management Plan* (Appendix D of Final EIS).

10 - 10

10) (Pg. 4-54, ¶4, 5th bullet) Recommend adding text to this mitigation measure stating, "Re- vegetation efforts that have failed will be re-done.

10 – 10
Comment noted. See revised text in this Final EIS.

10 - 11

11) (Pg. 4-64, ¶2, 6th bullet) The mitigation measure for the Carson Wandering Skipper needs to be clearer. It is not clear if the Winnemucca Ranch Road could be closed from May 15 to July 31 for construction traffic associated with the proposed projects or to all traffic.

10 – 11
See Response 10-6.

10 – 12

12) (Pg. 4-74, ¶4) The mitigation section for Visual Resources states that an objective is to reduce visual contrasts based on three concepts, the first being (1) Siting facilities in less visible areas. This section should include mitigation that directs the use of topography in the area to visually shield the tank from Matterhorn Boulevard and area residences.

10 – 12
Visual elements of the Proposed Actions were evaluated by BLM and determined to be in compliance with the Visual Resource Management system requirements.

10 - 13

13) (Pg.4-79) The Social and Economic Resources section of the DEIS are completely lacking in any substantive analysis. Specifically lacking are indirect socio-economic impacts to the North Valleys resulting from the importation of 11,500 af/yr of water. Also missing is any analysis of the socio-economic impact to the Honey Lake Valley area in the terms of decrease production of agricultural products on the Fish Spring Ranch, less employment as a result; and less available groundwater in the area that could promote future local development opportunities.

10 – 13
See revised text in *Direct and Indirect Impacts* and *Cumulative Effects* sections of this Final EIS, Chapter 4 – *Social and Economic Resources*.

10 - 14

14) (Pg. 4-96, ¶1) The cumulative impacts of groundwater withdrawal from the well arrays at Fish Springs Ranch and the anticipated water requirements for the proposed Granite Fox Power Plant by Gerlach have not been adequately analyzed in this section. The analysis uses 50 miles as the distance between the proposed power plant site and Fish Springs Ranch wells. The 16,000 ac/ft of water required for the power plant will actually be acquired from an area along the east side of the Smoke Creek Desert as far south of the plant site as Smoke Creek itself. The distance between Smoke Creek and Fish Springs Ranch is approximately 25 miles.

10 – 14
See revised text in *Direct and Indirect Impacts* and *Cumulative Effects* sections of this Final EIS, Chapter 4 – *Water Resources.*

10 - 15

15) (Pg. 4-96, ¶2) This section needs to more adequately analyze why additional pumping in Dry Valley is not expected beyond the proposed actions. Approximately 3,000 acres of property is owned by individuals, other than the proponent, that surround the Dry Valley well locations. The Washoe County Land Use designation for this entire area is "General Rural", which could potentially allow parcels as small as 40 acres in size, each conceivably with a well.

10 – 15
Text has been revised in the *Cumulative Effects* section for *Water Resources* in this Final EIS to delete speculation regarding additional pumping in the Dry Valley area. The Nevada State Engineer has authority over groundwater permitting and development.

10 - 16 16) (Pg. 4-97, ¶2) Recommend including any available hard data, or modeling assumptions, concerning the cumulative impacts to vegetation of draw-down from groundwater pumping in the Honey Lake Valley, Dry Valley and Bedell Flat. Existing text simply states "Additional adverse impacts may occur to wetland habitat from reduced flow at springs and/or flowing wells."

10 - 17 17) Statements in the DEIS should not foreclose any options on the place of use or manner of use for the water imported into the North Valleys.

10 - 18 18) Support for Alternative A because the two pipelines will use a common right-of-way that runs adjacent to the existing alignment of the Tuscarora Gas Pipeline. The DEIS should not foreclose on the option for both proponents to utilize a single common water line in the sections where they run parallel to each other.

10 - 19 19) Both proponents should work with the individual communities along the proposed pipeline route to coordinate and inform residents of construction activities and road closures.

END

10 – 16
Connection of the various aquifers that would be pumped in each of the three basins (Dry Valley, Bedell Flat, and Honey Lake Valley) to springs in these areas has not been established with certainty. Groundwater models include springs within the predicted drawdown areas and, as such, these surface water features could be affected by pumping if there is a connection between the surface water feature and the aquifer being pumped. Selected surface water features will be included in the monitoring program (see new Appendix D – *Recommended Water Resources Monitoring and Management Plan*).

10 – 17
The manner and place of beneficial use is Stead/Lemmon Valleys granted in the water transfer permit by the Nevada State Engineer.

10 – 18
Comment noted.

10 – 19
Comment noted.

Letter 11

TRUCKEE MEADOWS REGIONAL
PLANNING AGENCY

2005 JUL 18 AM 11:17

RECEIVED
BUREAU OF LAND MGMT
CARSON CITY
FIELD OFFICE

July 15, 2005

Terri Knutson, EIS Project Manager
Bureau of Land Management
Carson City Field Office
5665 Morgan Mill Road
Carson City, NV 89701

Dear Ms. Knutson:

This letter transmits comments from the Regional Planning Commission (RPC) on the *Draft Environmental Impact Statement -- North Valleys Rights-of-Way Projects*. The RPC, created pursuant to *Nevada Revised Statutes* 278.0262, approved these comments at its regular meeting on July 13, 2005.

General comments

First, as stated in the previous comments provided by the Director of Regional Planning, the scope of the DEIS is too narrow. The DEIS does not contain enough information on the environmental impacts of the proposed actions to allow the BLM to make a reasonable decision regarding them, or to allow the public to make an informed evaluation of the BLM's decision-making process. The statement (p. 4-2) that "BLM has no jurisdictional authority over water rights, pumping rates, distribution, use, and volume of water to be transferred to the North Valleys Planning Area" does not relieve the BLM of its duty under the *National Environmental Policy Act* (NEPA) to disclose environmental impacts.

Specifically, the EIS must disclose these direct, indirect, and cumulative effects of the proposed action on the affected area:

- Impacts on land use, housing, population density, and growth rate;
- Impacts on air quality and on surface water and groundwater quality and quantity;
- Impacts on traffic and transportation; and
- Impacts on public services and utilities including, without limitation, wastewater treatment facilities.

One East First Street, Suite 900, Reno, NV 89501-1625
775-321-8385; Fax 775-321-8386
http://www.tmrpa.org

11 - 1 "The EIS must identify all the indirect effects that are known, and make a good faith effort to explain the effects that are not known but are 'reasonably foreseeable.'" The BLM has the responsibility to make an informed judgment, and to estimate future impacts on that basis. The BLM cannot ignore uncertain, but probable, effects of its decision. (See *Forty Most Asked Questions Concerning CEQ's NEPA Regulations*, 46 FR 18026, as amended.)

Second, the DEIS is confusing to the RPC and the general public and does not present information in a way that decision makers and the public can readily understand. (See 40 CFR 1502.8, "Environmental impact statements shall be written in plain language . . . .")
11 - 2 Specifically, the DEIS employs a confusing and internally inconsistent array of planning areas, study areas, and other areas that obscure rather than clarify the anticipated environmental effects of the proposed actions.

For example, one of the main interests of the RPC is in the fate of the water to be provided by the proposed projects. The water will ultimately be distributed for municipal and industrial use, require treatment as wastewater, and create impacts on receiving waters underground or on the surface. In response to the Director's comment on the Preliminary DEIS, the BLM answered on April 29, 2005, "The fate of the water is disclosed – it will be used for residential, commercial, and industrial purposes in the North Valleys Planning Area." However, the DEIS provides at least three inconsistent definitions of that area:

- "The North Valleys Planning Area includes Antelope Valley, Cold Springs Valley, Lemmon Valley, Red Rock, and Bedell Flat hydrographic basins, which are designated as groundwater systems. The Planning Area . . . excludes the City of Reno in the Stead area." (p. 2-2)

- "The Proposed Actions are to install water pipelines and ancillary facilities on public and private land to convey groundwater from Honey Lake Valley, Dry Valley, and Bedell Flat hydrographic basins for municipal use in the Stead/Lemmon Valley areas. These areas are collectively referred to as the North Valleys Planning Area in this document." (p. 2-4)

- "The Proposed Rights-of-Way Projects are located in the North Valleys Planning Area in the unincorporated county, which the Washoe County Department of Community Development defines as the Antelope Valley, Cold Springs Valley, Lemmon Valley, and Long Valley Hydrographic Basins." (p. 3-64)

11 – 1
See revised text in *Direct and Indirect Impacts* sections of Chapter 4 in this Final EIS for all resources.

11 – 2
Text revisions have been made throughout the Final EIS to clarify geographic areas and references.

11 - 3 Further, although the definition on page 2-2 specifically excludes the City of Reno in the Stead area, the DEIS then describes the North Valleys Planning Area as including substantial areas <u>within</u> the City of Reno (e.g., the Reno Stead Airport) and says that sanitary sewer service will be provided, in part, by the City of Reno. (See pp. 3-57 and 3-72.)

11 - 4 In addition, the description of the affected environment for water resources (p. 3-12) introduces a new term, "North Valleys Study Area," different from all three definitions of the "North Valleys Planning Area," and including "eastern Honey Lake Valley, Dry Valley, and Bedell Flat watersheds, and portions of Antelope Valley, Lemmon Valley, Smoke Creek Desert, and Pyramid Lake Valley."

11 - 5 The EIS should explicitly identify the hydrographic basins in which water resources would be utilized, along with the basins from which water would be withdrawn, and analyze the effects of the proposed actions on all of those basins. The BLM should assume that water resource impacts would arise from both withdrawal of water from aquifers and discharge of that water to receiving waters. 11 - 6 In fact, the DEIS says (p. 4-8) that one of the categories of water resource impacts of the proposed projects is "impacts to water resources in areas where the water would be distributed (i.e., Lemmon Valley and Stead north of Reno/Sparks Nevada.)" But these impacts are disclosed <u>nowhere</u> in the DEIS.

<u>Additional comments</u>

11 - 7 Although intermittent pumping is listed as a possible mitigation measure (p. 4-43), the DEIS does not adequately disclose the anticipated impacts on either the water table or surface water discharge as a result of a change from seasonal withdrawals of groundwater for agricultural use (followed by periods of recovery) as opposed to year-round withdrawals for municipal and industrial use.

11 - 8 Regarding wildlife resources, the disclosure of impacts on the threatened Bald eagle is vague and incomplete. (See p. 4-58.) Describing the anticipated effects simply as "minor" is inappropriate. The EIS should include a quantitative estimate of direct, indirect, and cumulative Bald eagle habitat modification as a result of the proposed actions. The estimate should cover hydrographic basins that would be affected by water withdrawals as well as basins where the water would be utilized.

Finally, other specific comments are enclosed, with page and paragraph references.

11 – 3
See Response 11-2.

11 – 4
See Response 11-2.

11 – 5
Figure 3-1 has been revised in this Final EIS to outline other watersheds that surround the three basins that would be subject to proposed pumping in Honey Lake Valley, Dry Valley, and Bedell Flat. Water would be used for beneficial purposes in the Stead/Lemmon Valley area. See revised text in the *Direct and Indirect Impacts* and *Cumulative Effects* sections of this Final EIS, Chapter 4, *Water Resources*.

11 – 6
See Response 11-1.

11 – 7
The *Water Resources* section in Chapter 4 of this Final EIS describes in detail potential impacts to groundwater and surface water. See revised text in the *Direct and Indirect Impacts* and *Cumulative Effects* sections of this Final EIS, Chapter 4, *Water Resources*.

11 – 8
The "minor" effects described in this paragraph are referring to potential indirect impacts on springs that could be affected by groundwater withdrawal. Text in the preceding paragraphs describes the potential effect on the bald eagle.

Conclusion

Thank you for the opportunity to comment on the DEIS. We look forward to reviewing the Final EIS. Please do not hesitate to contact me at 775/321-8385 if you have any questions.

Yours truly,

David S. Ziegler

David S. Ziegler, AICP
Director of Regional Planning

/dz
enclosure
cc: Mike Carrigan, Chair, Regional Planning Governing Boarde
Florence "Marge" Frandsen, Chair, RPC
Adrian Freund, Washoe County DCD
John Hester, Reno DCD
Margaret Powell, Sparks City Planner
Jim Smitherman, Washoe County DWR

ENCLOSURE

Additional Comments:
Draft Environmental Impact Statement – North Valleys Rights-of-Way Projects
(BLM, USDOI, May 2005)

Regional Planning Commission
July 15, 2005

	No.	Page/Paragraph	Comment
11 - 9	1	1-6, Table 1-1	The Regional Planning Commission (RPC) must also review any master plan amendment of a local government or affected entity that may result from the proposed actions. It is not clear to the RPC why the City of Sparks is listed under the category of special use permits.
11 – 10	2	1-7, ¶5	With the adoption and conformance determination of the updated Regional Water Management Plan (RWMP), the interim water policies and criteria have been superseded. The correct reference is to RWMP 2004-2025, Policy 1.3.d.
11 - 11	3	1-8, ¶1	The statement attributed to "Ziegler, 2005" is incorrect. Ziegler (the Director of Regional Planning) did not make this statement. In comment #41 on the PDEIS, the Director said, "The RPC has determined that the master plans of Reno, Sparks, and Washoe County conform with the Regional Plan, with certain exceptions. The RPC's determination was not conditioned on or "pending" development of additional water resources. To develop land in the planning area (which the DEIS should explicitly identify), the proponent must provide adequate water rights and a physical water supply. This may or may not involve purchase, conversion, or importation."
11 – 12	4	1-8, ¶2	With the adoption and conformance determination of the updated RWMP, it is not clear why the BLM uses information from the 1997 RWMP.
11 - 13	5	1-10, Table 1-2	The representation that certain scoping comments of the Director of Regional Planning and others are covered in the Introduction, Chapter 1, is misleading. The Introduction does not address the comments.
11 - 14	6	2-1, -2, ¶5	On April 9, 2003, the RPC found Reno's and Washoe County's master plans in conformance with the 2002 Regional Plan, with 15 exceptions and 12 exceptions, respectively. On May 28, 2003, the RPC found Sparks' master plan in conformance with the 2002 Regional Plan, with 11 exceptions.
11 - 15	7	2-7, -8	The installation of a water line 30 inches or more in diameter or the construction of a new electrical substation would constitute a new utility corridor or facility in accordance with the Regional Utility Corridor Report (RUCR), an element of the Regional Plan, and would require a Regional Plan amendment prior to approval. The construction of an electrical substation would also be a project of regional significance under RPC Resolution 04-04 and NRS 278.026.

11 - 9
Table 1-1 has been revised in this Final EIS.

11 - 10
The reference has been revised in Chapter 1 of this Final EIS.

11 - 11
Text has been revised in Chapter 1 of this Final EIS.

11 – 12

The reference on page 1-8 is to the RWPC; not the RWMP.

11 - 13
Comment noted. Chapter 1 identities the specific decision to be made by BLM and disclosed in the EIS. Comments regarding the use of water in the stead/Lemmon Valley area, assessment of the various options that may be available to the purveyors of the water, and future decisions of the State Engineer are beyond the authority of BLM.

11 – 14
Comment noted.

11 – 15
The Regional Utility Corridor Report applies to major utilities and facilities including "water lines greater than 30 inches in diameter"and "greater than 5 miles in length". The proposed Fish Springs Ranch pipeline diameter is 30 inches; as such, the proposed pipeline does not meet these criteria.

No.	Page/Paragraph	Comment
8	3-57, ¶1	The statement, "Any proposed subdivision would need to obtain water rights from elsewhere or secure rights to conservation surpluses in order to be approved" is unsupported. Existing State and local laws address divisions of land. In general, approval of a subdivision in Washoe County requires a water right and a physical source of supply, among other requirements.
9	3-57, ¶5	Policy 1.2.7 of the Regional Plan defines the Reno-Stead Airport area as a regional center, subject to the applicable provisions of the Plan. Policy 1.2.16 defines Stead, generally, as an emerging employment center, also subject to applicable Plan provisions. Both centers are within the City of Reno.
10	4-45, ¶3	The EIS should disclose whether land subsidence would render flow losses or reductions from springs and wells irreversible.
11	4-51, -52, ¶5 4-52, ¶4	The level of uncertainty expressed in these paragraphs regarding groundwater drawdown and its effect on wetland vegetation, springs, and wells, is inappropriate. The BLM must make a good faith effort to ascertain these possible effects.
12	4-54, 8th bullet	The BLM should commit to implementing wetland banking or other off-site mitigation if adverse impacts occur to wetland areas.
13	4-55, ¶2, ¶3	The premise, here and elsewhere in the DEIS, that groundwater pumping could be stopped once it is started, is unrealistic. The impacts would be irreversible and irretrievable.
14	4-64, 7th and 8th bullets	These mitigation measures, which include only monitoring, are inadequate since they would not solve the identified problem.
15	4-81, ¶13	The disclosure of impacts on public utilities and services, especially wastewater facilities, is inadequate. Also, a large portion of the Reno-Stead Corridor Joint Plan area is within the City of Reno, which the DEIS says (in some statements) would not receive water from the proposed projects. See general comments.
16	4-82, ¶2	The statements regarding potential changes in land values are vague, speculative, and unsupported by any evidence.
17	4-93, ¶3	Limiting the analysis of cumulative impacts to the area depicted in Figure 2-1 is inappropriate. See general comments.

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11 – 16
Comment noted.

11 – 17
Comment noted.

11 – 18
Site conditions associated with individual springs within the projected groundwater drawdown areas for each well array included in the proposed projects vary and depend on the hydrogeologic function and characteristics of rock and soil materials supporting each spring. For those surface water features supported by local recharge and surface materials at specific springs that are comprised of collapsible soil or rock materials, the potential exists for local subsidence to occur. In some cases, reduction or cessation of groundwater flow in these locations would result in no measurable change in ground surface elevation. In other circumstances, surface materials may adjust to declining groundwater levels, including creation of localized ground subsidence.

11 – 19
The uncertainty associated with quantifying effects to specific springs and wetland-type habitat is related to whether the water sources for these features are from the regional aquifer for which the water table would be lowered by the proposed pumping projects. Many springs in the Projects area are located in or near the mountains for which the source water is relatively shallow groundwater and surface water that would not be affected by proposed pumping. Chapter 4 of this Final EIS includes best professional judgment as to whether specific springs and flowing wells could be affected by proposed groundwater pumping. A monitoring and management plan would be implemented to address uncertainties about the effects of pumping (see Appendix D in Final EIS).

11 – 20
See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) in this Final EIS. The proposed installation of pipelines in the rights-of-way across public land is not projected to have an adverse effect on wetlands and, therefore, no need for wetland banking or other mitigation has been identified.

11 - 21
Comment noted. See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) in this Final EIS.

11 - 22
Comment noted. See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) in this Final EIS.

11 – 23
See revised Indirect Impacts section for *Social and Economic Resources* in Chapter 4 of this Final EIS.

11 – 24
Comment noted.

11 – 25
See Response 11-2. See also Figure 3-1 in the EIS which has better coverage for the cumulative effects analysis.

Letter 12

Krys T. Bart, A.A.E.
Executive Director

2005 JUN -8

BUREAU

June 07, 2005

Bureau of Land Management
Carson City Field Office
Attn: Terri Knutson, EIS Project Manager
5665 Morgan Mill Road
Carson City, NV 89701

RE: REVIEW OF THE NORTH VALLEYS RIGHTS-OF-WAY PROJECTS DRAFT ENVIRONMENTAL IMPACT STATEMENT [2800 (NV030)]

Dear Ms. Knutson:

The Airport Authority of Washoe County (AAWC) has reviewed the Draft Environmental Impact Statement (EIS) for the North Valleys Rights-of-Way Projects. We would like to take this opportunity to thank and to recognize the Bureau of Land Management (BLM) and the other cooperating agencies for their collaborative efforts in the Draft EIS development process.

AAWC supports the project purpose and need which will meet both current and future domestic and industrial water demands in the North Valleys Planning Area. A decision that meets this project purpose should also ensure that the goals of the Truckee Meadows Regional Plan and those of the Washoe County and the City of Reno Master Plans will be met.

12 – 1 The Draft EIS indicates that an appropriate water purveyor will be responsible for establishing a water storage tank at the terminus site of the Intermountain Water Supply pipeline and distribution piping to allow connection to the existing water distribution system. However, it should be recognized that prior to development on AAWC owned property, negotiated lease/sale of property and/or necessary special use permits issued by the AAWC are required. By this, the AAWC would determine potential impacts to Reno/Stead Airport operations and assess other potential effects on-airport properties. The AAWC's intent is to work in conjunction with all interested parties to achieve water storage and distribution that will meet the project purpose and need.

12 – 1
Comment noted.

Airport Authority of Washoe County
Reno/Tahoe International Airport • Reno Stead Airport
P.O. Box 12490 • Reno, NV 89510 • 775-328-6400 • Fax 775-328-6414 • kbart@renoairport.com

We appreciate the opportunity to serve as a cooperating agency and to review this Draft EIS. If you would like to discuss our comments in further detail, please call Dean Schultz, Director of Planning and Environmental Services, at (775) 328-6469.

Sincerely,

Krys T. Bart

Krys T. Bart, A.A.E.
Executive Director

CC: Marily Mora, AAWC Deputy Executive Director
Joan Dees, AAWC Senior Director of Finance and Administration
Mark Witsoe, AAWC Manager of Properties
Dave Lazo, AAWC Manager of Engineering
Ann Morgan, AAWC Legal Counsel
Skip Polak, AAWC Manager of Reno/Stead Airport
Dean Schultz, A.A.E., AAWC Director of Planning and Environmental Services

Letter 13

STATE OF CALIFORNIA – THE RESOURCES AGENCY
ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF WATER RESOURCES
NORTHERN DISTRICT
2440 MAIN STREET
RED BLUFF, CA 96080-2356

July 20, 2005

Ms. Terri Knutson
EIS Project Manager
Bureau of Land Management
Carson City Field Office
5665 Morgan Mill Road
Carson City, Nevada 89701

Dear Ms. Knutson:

As a cooperating agency, DWR appreciates the opportunity to review and comment on the BLM's May 2005 Draft Environmental Impact Statement (DEIS) for the North Valleys Rights-of-Way Project. Through issue scoping and DEIS development, DWR has attempted to clarify professional jargon, correct errors and make clear the limitations of groundwater modeling when used as a tool to predict impacts from groundwater development.

Attached are several page/paragraph specific comments on the comments spreadsheet you provided. Some of these comments may be somewhat redundant to those we provided on June 19th of this year, but there are some additional observations.

<u>DRY VALLEY- Intermountain Water Supply Project</u>

The DEIS states that evaluations of impacts for the proposed groundwater pumping are based on estimates using computer groundwater models (p. 4-10), which is true, however we think it is important to also state that the 2004 USGS study, *Estimates of Natural Ground-Water Discharge and Characterization of Water Quality in Dry Valley, Washoe County, West-Central Nevada, 2002-2004* (Berger, et al), was undertaken by the USGS in cooperation with Washoe County to evaluate the groundwater resources of the valley for possible development.

This was not a singular effort of one USGS worker, documenting the outflow from Dry Valley to Long Valley in California, as purported by the project proponent at a recent public meeting. This was a multidisciplinary scientific field study that developed the data necessary to provide a scientific basis for an estimate of the groundwater resources of Dry Valley. Findings from that study indicate that there are only about 750 to 1,000 AF of groundwater available for sustainable annual use.

Interestingly, the significant impacts predicted in the groundwater modeling of extracting 3,000 AF/Yr from Dry Valley, done by Interflow Hydrology in 2005, corroborates the USGS (Berger et al. 2004) findings. The modeled extraction far exceeds the sustainable yield of Dry Valley.

The USGS review of the Interflow modeling states that several model assumptions were "overly imaginative", "over estimated" and "unsubstantiated". These assumptions inflated the amounts of water in several portions of the water budget. The comment by the USGS reviewer, that "several assumptions are overly imaginative, but do not greatly alter the water budgets of the two hydrographic areas" (he includes Bedell Flat), seems to be a somewhat roundabout indication that the very limited amounts of available groundwater make the relative variation of model input insignificant (interpretation based on public communication June 28, 2005).

The Dry Valley proposed project pumping of 3,000 AF/Yr, as modeled, would impose significant impacts to the valley and probably to adjacent basins. Indeed, Table 4-5 (p. 4-26) shows that the proposed project extraction level would require:

1. All of the annual recharge from estimated precipitation,
2. All of the postulated deep inflow along fault zones,
3. All of the evapotranspiration that currently supports vegetation,
4. All of the subsurface groundwater outflow.

This proposed project is not consistent with *Nevada Revised Statutes 533.271* as noted in the DEIS on page 4-10. These statutes say that "in Nevada, withdrawal of groundwater from a basin is limited by law to the estimate of perennial yield." Perennial yield is then defined as the "maximum amount of natural groundwater discharge that can be salvaged each year over the long-term by pumping without bringing about some undesired result." In the DEIS this definition is attributed to the Nevada State Engineer (1974).

Current Interflow Hydrology modeling predicts dewatering of the basin, the probable die off of most vegetation, and eventual pirating of nearly two thirds of the proposed project pumping level of 3000 AF/Yr from Long Valley Creek in California. These impacts would certainly constitute "undesired results".

The Nevada State Engineer issued the permit for 3,000 AF of annual extraction for Dry Valley in 1998. In light of the new "estimates" of perennial yield that have been developed by the USGS and by the project proponents, it seems prudent that the permit for Dry Valley groundwater extraction be re-evaluated and revised by the State Engineer. The revised permit could then be used to appropriately size a possible Dry Valley Project for a Final EIS.

Ms. Terri Knutson
July 20, 2005
Page 3

13 - 1 If this project goes forward, prudent project management should include a monitoring and mitigation program that includes groundwater level and quality aspects. Trigger points or thresholds of groundwater level declines should be set with specific proposals of mitigation actions.

FISH SPRINGS RANCH LLC

The predicted impacts of the proposed Fish Springs Ranch project, extracting and exporting 8,000 AF of groundwater annually, are based wholly on groundwater modeling. The project, as proposed, would pump and export about twice the largest annual volume of groundwater used historically on the ranch. As discussed in the DEIS and Appendix C of the DEIS, the history of groundwater modeling and model predictions for different annual extraction amounts, ranging up to 15,000 AF, has stretched over a period of about 15 years. Issues and questions regarding data sets used, mathematical parameters, and modeling assumptions have driven the long lasting debate over what a sustainable amount of extraction and export of groundwater from FSR might be. Because there are still differences of opinion on these issues in the cited literature, and insufficient data to support or refute the correctness or adequacy of the modeling used in this DEIS, the current modeling still merits critique.

For instance, USGS WSP 2315, which evaluates the effects of changing groundwater model boundary conditions on identical hypothetical groundwater systems, shows that changing boundary conditions can greatly affect the impact of applied stresses (eg, groundwater removal). The findings of this evaluation are "that differing boundary conditions define different ground-water systems", or stated otherwise, if a simulated ground-water system has incorrect boundary conditions (conditions that do not correspond to those in the natural system under study), then the simulation exercise is solving the wrong problem and, by definition, will provide the wrong solution.

These findings are relevant to the 2004 modeling of the proposed project operation and impacts on the FSR for this DEIS; primarily for the western model boundary and the eastern model boundary.

It is stated in the DEIS, on page 4-13, that the current Lahontan GeoScience model for FSR shifted the western boundary 5 miles to the east (relative to the 1990 model) to coincide with "a groundwater divide identified at that location" and general head cells (water can flow both directions across this boundary) were used to represent this western model boundary". Generally, a groundwater divide (or any hydrologic divide) implies separation of water flow by topography or geologic structure (faults). In that case it would seem more appropriate to assign a no-flow boundary condition at the western model boundary.

13 – 1

See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) in this Final EIS. Specific trigger points or thresholds have not been determined at this time; however, a committee will be established to review all suspect situations to determine if an effect is related to pumping by the Proponent(s), and if mitigation would be required.

13 - 2 In addition, in Appendix C (p. C-8) this western model boundary is described as, in part, a no-flow boundary and in part a general head boundary. Aside from the conflict of descriptions in the DEIS, what knowledge or assumptions were used to characterize this boundary? Several other workers have noted that it is unknown how the divide extends into the subsurface. This may constitute "solving the wrong problem." A comparative analysis using a no-flow boundary may be prudent.

13 - 3 The Lahontan GeoScience model water budget asserts that for baseline conditions 17 AF are lost to the west, which implies a flow boundary. The stress of project operations would "salvage" 1 AF. In contrast, the 1990 USGS (Handman, et al) model also used a general head boundary on the western edge of their model and simulated about 600 AF of eastward flux. The lack of data for the body of the basin makes these highly dissimilar estimates very questionable.

13 - 4 A similar question arises regarding the flow boundary on the eastern edge of the model. Despite several previous workers' findings (noted on page 4-16 of the DEIS), that this is most likely a no-flow boundary, a general head boundary has been used. The general head boundary may allow "extra" water, ordinarily lost from the basin through outflow, to be available for "salvage" in the proposed FSR project. Changing to a no-flow boundary would reduce the modeled water budget by about 720 AF. What criteria were used to set a general head boundary at the eastern edge of the model?

13 - 5 In addition to model assumptions, there are other concerns regarding data input to the FSR groundwater model. Other than bare playa surfaces, it is not clear what rates of evapotranspiration were used for vegetated areas for this modeling. In section three of the DEIS, reference is made to rates used by Handman (1990) and Walker and
13 - 6 Associates (2004), but no rates are included in the description of the model. Also we question the hydraulic conductivity of the "southern volcanic rocks" listed on page C-9, 45 ft/day is an extremely high value. Referencing Driscoll (Groundwater and Wells, 2nd Edition), Table 15.4 provides estimates of hydraulic conductivity for different aquifer materials. Tuffaceous rocks would fall in the range of about 0.0045 to perhaps 15 ft/day, based presumably on degree of consolidation and fracturing.

13 - 7 We think that the questions posed should be thoroughly explained and resolved. Discussion of model "construction" and data input with participation from the USGS was requested in the scoping process. Because of the remaining questions regarding boundary conditions, and the data input noted above, we regard it as highly advisable to have a more in depth USGS review of the FSR modeling assumptions, and the reliability of the predictive model output.

13 – 2

Figure 8 in Lahontan (2005) includes a potentiometric surface map based on 2003 groundwater elevations. This map shows a generally north-south trending groundwater divide at the general location of the western margin of the model domain. This divide is treated as a no-flow boundary in the northern portion of the boundary where the divide would not be impacted by pumping. The southern portion of the western boundary was treated as a general head boundary because effects of pumping at Fish Springs Ranch could result in movement of this divide farther to the west or eliminate the divide altogether. Use of a general head boundary allows for quantification of changes in water flux across the boundary caused by pumping.

13 – 3

See revised Table C-1 (Appendix C) in this Final EIS. The 1990 USGS model did not include the interpretation of a groundwater divide between the eastern and western portions of Honey Lake Valley, which accounted for interpretation of greater flow to the west compared to the current model.

13 – 4

Several authors (Moll 2000, Handman et al. 1990, etc.) have discussed conceptual models for groundwater flow in the eastern portion of Honey Lake Valley. These discussions generally fall into two categories: those supporting the concept that there is flow between Honey Lake Valley and basins to the east, and those supporting the concept that groundwater within Honey Lake Valley is not in hydraulic communication with groundwater in basins to the east. This is acknowledged in the EIS. Definitive proof of either of these concepts has not been presented. Justification for boundary conditions used in the current version of the model is described in Lahontan (2005) and Handman et al. (1990). If Honey Lake Valley groundwater is not in communication with groundwater in basins to the east, drawdown within Honey Lake Valley could be greater than predicted assuming all other recharge and discharge factors in the hydrologic balance remain the same.

13 – 5

See revised text in Appendix C of this Final EIS for evapotranspiration rates from vegetated areas.

13 – 6

As stated on page 3-24 of the Draft EIS, transmissivities measured in four wells completed in volcanic rocks near Fish Springs Ranch ranged from 25 to 14,000 ft^2/day. Assuming a saturated aquifer thickness of 400 feet, the highest hydraulic conductivity (K) would be 35 ft/day. This matches the upper end range of K-values cited by Freeze and Cherry (1979) in their book "Groundwater" for fractured igneous and metamorphic rocks. The use of 45 ft/day in the Fish Springs Ranch model likely takes into account the highly fractured nature of volcanic rocks that occur in southeastern Honey Lake Valley.

Ms. Terri Knutson
July 20, 2005
Page 5

13 - 7 In the final analysis, rather than continuing the "model debate" our recommendation would be to have the USGS do a hydrogeologic evaluation of the FSR area similar to the Dry Valley investigation. This would provide the necessary data to show whether or not the groundwater modeling can be used as a reasonably accurate predictive tool.

13 - 8 If this project goes forward, prudent project management should include a monitoring and mitigation program that includes groundwater level and quality elements. Trigger points or thresholds of groundwater level declines should be set with specific proposals of mitigation actions. Water quality testing should include isotope age dating. Groundwater in the lower zone in the FSR area has been age dated at about 17,000 years. If increased extraction in that zone is found to produce "old" water, it would indicate that the mining of an ancient nonrenewable aquifer is taking place. If that were to occur, the viability of the supply would be limited.

If you have any questions or need additional information, you may contact Noel Eaves of my Groundwater Section staff at (530) 529-7335.

Sincerely,

Dwight P. Russell, Chief
Northern District

Attachment

cc: Robert K. Sorvaag, Director
Lassen County Department of Community Development
707 Nevada Street Suite 5
Susanville, CA 96130-3912

13 – 7

The USGS has reviewed all three groundwater flow models completed for proposed projects, and provided their comments to BLM regarding model inputs and results.

13 – 8

Comment noted. See Response 13-1.

North Valleys Rights-of-Way Projects Draft EIS

Review Comments

	Cmt	Page	Line	Commentor	Comment	Response
13 - 9	1.	2-18	Para. 1	N. Eaves	FSR has proposed a monitoring program to document changes that occur in groundwater levels and quality in the eastern HLV area.	The criteria for groundwater quality testing are not specified. Age testing should be included in water sampling and testing, since two thirds of the increased pumping is slated for Layer 2, where water has been dated at about 17,000 yrs. ago when the climate was much cooler and wetter. Extraction of predominantly "old" water could indicate groundwater mining in the lower zone.
13 - 10	2.	2-18	Para. 3	N. Eaves	The monitoring network would be expanded to include a monitoring well near the Cal-Neva State Line	A Cal-Neva monitoring well should be a multi-completion well to monitor whether there is significant hydraulic connectivity between the shallow and deep zones.
13 - 11	3.	2-27	Para. 3	N. Eaves	Two production wells (DV-1 and BF-1) would be locaterd....	It has been demonstrated that existing wells in Dry Valley do not have a 1500 gpm capacity. It is unlikely that only two wells would be adequate. The project description should note that an unknown number of wells would be drilled.
13 - 12	4.	2-32	Para. 8	N. Eaves	Proposed Resource Monitoring	It is unlikely that the proposed mitigation measure of deepening wells could mitigate for the probable impacts to other rights holders.
13 - 13	5.	3-22	Para. 6	N. Eaves	....but may flow east out of the eastern side of the valley to Pyramid Lake Valley...and Smoke Creek Desert....	No mention is made of the other work that refutes this outflow. Bohm 1990, Moll 2000, Varian 1997. This interpretation is critical to the use of a no-flow boundary or general head boundary for the groundwater model. See p.4-16 of the DEIS.
13 - 14	6.	3-22	Para. 6	N. Eaves	A groundwater divide appears to be located about 3 miles west of the state line resulting in no horizontal groundwater movement in this area...	Again, critical to model boundary assumptions. No-flow or general head?

13 – 9
See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) in this Final EIS, which includes monitoring activities for groundwater.

13 – 10
See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) in this Final EIS, which includes completion of a monitoring well near the CA-NV state line.

13 – 11
See revised Proposed Action description for Intermountain Water Supply – Chapter 2. Five production wells are now proposed for Dry Valley for a combined total of 2,000 af/yr.

13 – 12
Comment noted. See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) in this Final EIS. Specific mitigation measures, if needed, will be determined by a committee and the Nevada State Engineer on a case-by-case basis.

13 – 13
Page 4-16 of the Draft EIS cites Bohm (1990), Moll (2000), and Varian (1997) as investigators that believe there is little or no flow to Smoke Creek Desert and Pyramid Lake Valley. The reports by these three authors are summarized in Appendix C of the EIS. See Response 13-4.

13 – 14
See Response 13-2.

	Cmt	Page	Line	Commentor	Comment	Response
	7.	3-23	Para. 1	N. Eaves	Evapotranspiration rates from areas of phreatophytic vegetation generally ranges from to 0.1 to 0.3 ft/yr (Handman et al. 1990 and Walker and Associates 2004)	This is in general agreement with ET rates in the region cited by other workers. In Appendix C p.C-9 the only ET rate indicated for the modeling for this DEIS is 40 in/yr for the playa, no valus are indicated for the phreatophytes or other vegetated areas.
13 - 15	8.	3-29	Para. 2	N. Eaves	During 2002-2004, the USGS conducted a hydrogeologic study of the western part of Dry Valley (Berger et al. 2004)	The USGS study included all of Dry Valley. The study should be identified as a cooperative between the USGS and Washoe County intended to evaluate the groundwater resources of the valley for possible use in export.
13 - 16	9.	3-29	Para. 4	N. Eaves	The "perennial" or "safe-yield"......was determined by the Nevada State Engineer in 2002.....	In Appendix C p. C-3 the chronology of events identifies that the State Engineer approved a water right for 3,000 AF to IWC in 1998. Is there a difference in the permitting or is the 2002 date incorrect?
13 - 17	10.	3-30	Para. 6	N. Eaves	Interflow Hydrology (2004b) believes a production well at this location would need to be operated with non-pumping periods to sustain reasonable water levels in the well over the long-term.	This indicates that the well was pumped at a volume that exceeded a sustainable specific capacity of the well. The gpm of the test should be stated for the lay audience.
13 - 18	11.	4-13	Para. 3	N. Eaves	.....and used general head boundary cells to represent the western model boundary.	Again, there are several boundary descriptions in the DEIS that contradict one another. Which is it? And why did the differences occur, an evolution in thought or mere misstatement.
13 - 19	12.	4-13	Para. 4	N. Eaves	....and the maximum ET rate (40 in/yr versus 48in/yr used in the 1990 USGS model)......	Again, ET rates used in the DEIS model for open playa are given but not the ET rates used for the phreatophytes. What rates were used?
13 - 20	13.	4-16	Last para.	N. Eaves	....and the water balance for Honey Lake Valley would need to be adjusted for reduced outflow from the basin.	The question of the appropriate boundary condition to use is applicable here. The difference of opinion between workers is noted in the DEIS text. Was the model run using a no-flow boundary at the eastern model boundary? And if not, why? There are data available to refute the flow of water out of the basin to the east.

13 – 15
See revised text in Chapter 3 of the Final EIS that incorporates your suggested language.

13 – 16
The State Engineer issued water rights in Dry Valley totaling 3,000 af/yr in 2002. Appendix C has been revised to reflect this date.

13 – 17
See Response 13-11.

13 – 18
General head boundary cells were used for the southern portion of the groundwater divide west of the state line, and no-flow boundary cells represent the northern portion of this groundwater divide. The text in the *Water Resources* section of Chapter 4 in the Final EIS has been revised to reflect this model boundary condition.

13 – 19
See Response 13-5.

13 – 20
As stated in the *Water Resources* section of Chapter 4 in the EIS, Moll (2000) excluded groundwater flow to Smoke Creek Desert and Pyramid Lake Valley from her model (i.e., no-flow boundary along east side), with groundwater drawdown predictions in eastern Honey Lake Valley similar to those presented in the EIS (Figure 4-1) for the Proposed Action using a pumping rate of 8,000 af/yr.

	Cmt	Page	Line	Commentor	Comment	Response
13 - 21	14.	4-25	Para. 2	N. Eaves	Hydraulic conductivities used in the model are 4.0 ft/day for layer 1, 0.25 ft/day for Layer 2 and 1.0 ft/day for Layer 3.	This is one of the over estimates that the USGS reviewer was probably referring to: "unsubstantiated hydraulic conductivity estimates". Hydraulic conductivities used by Berger et al. (2004) ranged from 0.3 to 0.375 ft/day.
13 - 22	15.	4-44	Para. 3 2nd to last	N. Eaves	This water level monitoring could continue for several years after increasing total pumping rate to 8,000 AF/yr to determine if the magnitude and extent of groundwater drawdown areas are similar to model predictions.	A Monitoring and Mitigation Program requiring continued groundwater level monitoring should be in place before the project is approved.
13 - 23	16.	4-44	Last para.	N. Eaves	.....groundwater samples could be collected periodically from selected wells to determine if any significant water quality	As above for a Monitoring and Mitigation program. Included in the WQ sampling and testing should be isotope sampling to determine the age of the groundwater being extracted. This would be a test of whether old water is being removed and not being replenished by current recharge.
13 - 24	17.	C-9	K-values	N. Eaves	4. Southern volcanic rocks = 45ft/day	Using Figure 5.14 Estimating Hydraulic Conductivities in Groundwater and Wells, Second Edition by Driscoll: A tuffaceous rock would fall in the range of perhaps 15 to 0.0045 ft/day probably depending on the degree of consolidation and fracturing; 45 ft/day seems quite high.
13 - 25	18.	2-3 **	Para. 3	N. Eaves	...and groundwater modeling has been completed with US Geological Survey review.	I think the scope of the USGS review should be described. It should be noted that the USGS did not necessarily concur with the results of the modeling nor did they comment on the reliability of the predicted results. Terri, at the Reno meeting you indicated that you knew the scope of what the USGS said it was willing to do. I think that scope should be described. Implying total peer review in this case is misleading.
	19.	**			**Comment out of sequence**	
	20.					

13 - 21

As stated in the *Water Resources* section of Chapter 3 in the Draft and Final EIS, hydraulic conductivity (K) determined from two wells tested in Dry Valley range from 3 to 12 ft/day. Therefore, the highest K-value used in the Dry Valley groundwater model of 4 ft/day is reasonable.

13 - 22

See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) in the Final EIS, which includes monitoring activities for groundwater.

13 - 23

See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) in the Final EIS, which includes monitoring activities for groundwater.

13 - 24

See Response 13-6.

13 – 25

See Response 13-7.

Letter 14

County of Lassen
Board of Supervisors

ROBERT F. PYLE
District 1
JIM CHAPMAN
District 2
LLOYD I. KEEFER
District 3
BRIAN D. DAHLE
District 4
JOHN E. HANSON
District 5

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July 19, 2005

Terri Knutson
Environmental Planner
Bureau of Land Management
Carson City Field Office
5665 Morgan Mill Road
Carson City NV 89701

RE: North Valleys Water Projects Environmental Impact Statement
Cooperating Agency Review of Draft EIS

Dear Ms. Knutson:

Lassen County appreciates the opportunity to review and comment as a cooperating agency on the Draft North Valleys Water Projects Environmental Impact Statement (DEIS). In our preliminary review of the DEIS we have noted that many of the issues we raised in our March 25, 2005 letter have been addressed. However, there are several critical outstanding issues that render this document inadequate which are identified below.

The Lassen County Board of Supervisors is concerned that the DEIS does not provide adequate information that addresses and resolves the issues raised by the Secretary of the Interior in 1994 that caused suspension of a similar project:

1) Concurrence of the USGS on ground water modeling;
2) Sierra Army Depot ground water contamination;
3) Concurrence from Pyramid Lake Paiute Tribe on Trust Responsibility issues.

14 - 1 Furthermore, the DEIS does not describe or contain further detail of the monitoring, mitigation, trigger point action, loss compensation or enforcement responsibilities as required by NEPA (Sec. 1505.2) as prerequisite to BLM action on the project despite such requests by Lassen County (1-13-04 and 3-25-05).

14 – 1
See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) in this Final EIS. Specific trigger points or thresholds have not been determined at this time; however, a committee will be established to review groundwater data to determine if an effect is related to pumping by the Proponent(s), and if mitigation should be required. Note: Section 1505.2 of CEQ refers to contents of a Record of Decision; not this phase of the EIS process.

The DEIS still relies on the USGS Report *Water Resources of Honey Lake Valley, Lassen County, California and Washoe County, Nevada* by Handman et al. (1990), which as discussed in our previous comments has been found to be flawed. We have noted that as requested by Lassen County, the DEIS does recognize conflicting research that has been done *(Appendix C)*, but no attempt has been made to do any subsequent groundwater modeling based on the results and critiques of this research. The groundwater model summaries and evaluations contained in Appendix C appear to be mostly academic and have not been used in the DEIS findings or results. The research of both Varian (1997) and Webber (1996) indicate that basin outflow to Smoke Creek Desert and Pyramid Lake Valley is not occurring. Mayo and Slosson (1992) and Principia Mathmatica (1993) both pointed out the flaws in the evapotranspiration estimates. A groundwater model should be run using this information as it may affect the model results.

14 - 2

In the Lassen County scoping letter dated January 13, 2004, and again in our March 25, 2005, comments on the Preliminary DEIS, Lassen County requested that groundwater age data be used. As mentioned above, Appendix C includes summaries of age dating work done by Rose et. al (1997) and Varian (1997) on the groundwater in the Honey Lake Valley, but this information is not incorporated into the body of the DEIS. At the June 28, 2005, public meeting, a consulting representative of the applicants reaffirmed that age dating had not been done by the applicant on the groundwater. As Lassen County has previously stated, without the use of groundwater age and isotopic information there is no evidence that ancient water is not being mined. In fact, studies submitted by Lassen County and requested be incorporated into the record state that recharge of the eastern Honey Lake Basin may have occurred up to 8,000 years ago (Varian, 1997, pg 109). With respect to the main component of recharge to the deep ground water system (>180 m):

14 - 3

> …(it) is water that was derived in a cooler, wetter climate up to 17,000 years ago (based on ^{14}C apparent age). Hence, the deep ground water system is dependent on the paleohydrology of the basin. (Varian, 1997, pg 111).

In its letter dated March 24, 2005, the United States Geological Survey (USGS) cited several flaws with the modeling work done by InterFlow Hydrology, Inc. on the Dry Valley and Bedell Flat Hydrographic Basins. Points made by USGS include:

> "Several assumptions are overly imaginative…"

- With regards to Dry Valley-

> "Discussion of recharge by precipitation intervals suggests that the author does not understand the Maxey-Eakin method…Application of these coefficients to distributions where precipitation exceeds the Handman estimates will artificially inflate recharge estimates."
> "Groundwater discharge to Long Valley is overestimated because of the highly imaginative geologic interpretation in Model Layers 2 and 3."

14 - 2

The BLM acknowledges in the EIS that there were several critical commenters on the 1990 USGS report (Handman et al. 1990) that contains the original Honey Lake Valley groundwater flow model; however, the report provided a considerable amount of baseline data and the framework for the model that has been subsequently built upon with additional models. The most recent 2005 model results (Lahontan 2005) for Fish Springs Ranch used in this Final EIS (described in Appendix C) was updated since the original 1990 model was completed. As stated in the *Water Resources* section of Chapter 4, the model completed by Moll (2000) excluded groundwater flow to Smoke Creek Desert and Pyramid Lake Valley, with groundwater drawdown predictions in eastern Honey Lake Valley similar to those presented in this EIS for the Proposed Action at Fish Springs Ranch using a pumping rate of 8,000 af/yr. As stated in Appendix C, the most recent version of the model presented in this EIS incorporated groundwater information obtained since 1990, including data from the California Dept. of Water Resources, Sierra Army Depot, Herlong Utilities Cooperative, Washoe County, and Fish Springs Ranch. Improved estimates of evapotranspiration were incorporated into Evapotranspiration Package cells in the model. Recent water level data were used as calibration targets and the model was run to demonstrate that the model was still calibrated.

14 – 3

BLM acknowledges age-dating work conducted by other investigators for groundwater in Honey Lake Valley. While this information is valuable for characterizing the age of groundwater in the basin, the assessment of impacts presented in the EIS focuses on groundwater drawdown and quality effects, regardless of its age. The Nevada State Engineer, with concurrence from the Nevada Supreme Court, approved the interbasin transfer of about 13,000 af/yr for Fish Springs Ranch based on its assessment that no significant adverse effects would occur.

- With regards to Bedell Flat-
  "Complex hydraulic conductivity distribution and multiple recharge rates from 2 transmissivity estimates and 8 water levels seems difficult to justify."

14 - 4 With these comments in mind Lassen County is not satisfied with results included in this DEIS. Furthermore, Lassen County respectfully disagrees with the statement made by USGS that the assumptions made will not greatly alter the water budgets of the two hydrographic areas. The "artificially inflated" estimates, incorrect flow assumptions, "imaginative geologic interpretation," and other inconsistencies prompt the County to assume that together these could greatly alter the water budgets of Dry Valley and Bedell Flat. Additional modeling should be conducted with corrections made to the coefficients used, assumptions made, etc.

With regard to Fish Springs well fields, complete historical data on Fish Springs Ranch water use has not been presented. As it is understood by Lassen County, 4,200 af/yr was pumped from the existing wells at Fish Springs Ranch for irrigation purposes in 2003. Pumping 4,200 af/yr seasonally to irrigate approximately 1,400 acres of alfalfa onsite does not have the same impacts of pumping 8,000 af/year for extraction and removal
14 - 5 from the Honey Lake Basin. No scientific connection has been proven between the monitoring and measurements for actual well field pumping (i.e. 4,200 acre feet seasonally applied to alfalfa) and the modeling relied upon in the DEIS. This history and modeling does not reasonably predict that 8,000 acre feet can annually be exported from the basin on a perennial sustainable basis pursuant to Nevada State Law. Similarly, to date, no information has been presented that shows USGS is in concurrence on the groundwater modeling results for Fish Springs Ranch. If this has not already been done,
14 - 6 a formal request should be made to USGS to conduct an analysis to determine if the groundwater modeling has been sufficient to show sustainable supply in the Fish Springs Ranch area. At the January 2004 Scoping Meeting, Lassen County requested an analysis be conducted by USGS of realistic field data. In addition, Lassen County has requested that BLM, USGS and DWR review all existing modeling, actual field measurements, well monitoring and concur on methodology to produce valid results.

The document is inadequate in that it does not address the issue raised by the Secretary of the Interior with regard to Sierra Army Depot groundwater contamination. The DEIS
14 - 7 lacks evidence that the toxic plume lying underneath the Sierra Army Depot will not migrate toward the well field (resulting from pumping or changes to the water gradient), nor is there a monitoring or mitigation program proposed that would track possible movement of the plume.

Additionally, concurrence from the Pyramid Lake Paiute Tribe and/or the BIA on Trust
14 - 8 Responsibility issues should be obtained prior to moving forward with this EIS as trust responsibility is one of the three reasons given for suspension of the previous EIS.

14 – 4

Comment noted. The groundwater flow model for Dry Valley has been revised and incorporated into this Final EIS because the Proposed Action now includes a reduced pumping rate of 2,000 af/yr (versus 3,000 af/yr in Draft EIS) using five production wells (versus two wells in Draft EIS). The Proposed Action for Bedell Flat has changed to include two production wells (versus one well in the Draft EIS); however, the groundwater flow model for Bedell Flat was not revised because the two wells would be located in close proximity to one another and the resulting groundwater drawdown would not change substantially from that predicted by the model used for the Draft EIS.

14 – 5

See Appendix F as part of this Final EIS that contains the pumping history for Fish Springs Ranch, as well as hydrographs showing historic groundwater level fluctuations for the ranch's irrigation wells. The EIS acknowledges that the Proposed Action for Fish Springs Ranch would eliminate groundwater recharge that occurs during application of irrigation water in the basin. The Nevada State Engineer, with concurrence from the Nevada Supreme Court, approved the interbasin transfer of 13,000 af/yr for Fish Springs Ranch based on its assessment that no significant adverse effects would occur (see Lassen County Board of Supervisors and Pyramid Lake Tribe v. Washoe County, et al, 112 Nevada 743 (1996); 918 P.2d 697).

14 – 6

The USGS, as a cooperating agency, reviewed and commented on the groundwater models most recently completed for Honey Lake Valley, Dry Valley, and Bedell Flat. Even though the USGS had critical comments about the models, their general conclusion is that the modeling efforts are valid. The history of Honey Lake Valley models and criticisms demonstrates that models are tools that can be subject to a variety of assumptions and interpretations. Models rely on inputs of available geologic and hydrologic data, the extent of which should be sufficient to adequately represent and predict site-specific conditions. It can be argued that there are not sufficient data to get reasonable model results because there are no rules that specify how much data are enough. Best professional judgment is used by persons who are experienced with the models. This has been done for the North Valleys Rights-of-Way Projects EIS.

14 – 7

Model results described in the *Water Resources* section of Chapter 4 and additional information contained in Appendix C of the Draft and Final EIS indicate that groundwater pumping associated with the Fish Springs Ranch project would not cause drawdown nor alter the current flow direction of groundwater in the vicinity of the Sierra Army Depot. Groundwater monitoring will be performed to verify that such effects will not occur (see Appendix D - *Recommended Water Resources Monitoring and Management Plan* - in this Final EIS).

14 – 8

Formal consultation and communication with the Pyramid Lake Paiute Tribe has been initiated and is ongoing. The Tribe and BIA have been participating as cooperating agencies in the EIS process. Potential impacts to tribal resources are disclosed in the EIS.

According to the approximations presented in the DEIS, groundwater drawdown will continue to increase over the next 100 years at all wells (see Figures C-1 and C-2). For the Fish Springs Ranch Groundwater Flow Model, Lahontan (2004) makes the approximation that 95% of total groundwater drawdown will be achieved in the pumping center after 100 years (page C-12). In Dry Valley, the ground water model results suggest that the proposed pumping rate of 3,000 af/yr cannot be sustained indefinitely (page C-15). At Bedell Flat, the Groundwater flow Model shows that 65% of reductions in water levels, subsurface outflow and evapotranspiration are achieved after 100 years of pumping. These approximations do not show a balance ever being achieved between recharge and discharge as described as necessary per the Nevada State Engineer and Nevada Water Law and discussed in the in the DEIS at page 4-10:

> A groundwater cone-of-depression would expand in time after startup or increase in pumping until a balance is reached between recharge and discharge within the radius of influence. In general, if the volume of groundwater removed from pumping wells and other discharges is equivalent to or less than the groundwater recharge rate within a given basin, then there is no net removal of the groundwater resource. In Nevada, withdrawal of groundwater from a basin is limited by law to the estimate of "perennial yield" (Nevada Revised Statutes 533.271). Perennial yield is the "maximum amount of natural groundwater discharge that can be salvaged each year over the long-term by pumping without bringing about some undesired result" (Nevada State Engineer 1974).
>
> Groundwater removal would create a cone-of depression (zone of influence) around the pumping wells in each basin, whereby the water table is lowered to provide a hydraulic gradient that allows groundwater to move to the wells. Groundwater models calculate and graphically depict the expanding cone-of-depression over time, as well as predict if and when drawdown ceases due to a balance between groundwater recharge and discharge. The models simulate withdrawal of groundwater from each pumping well on an annual basis, incorporating hydrologic balance information and aquifer characteristics. Several assumptions and estimated data are used in the models; therefore, results should be considered approximations of future conditions based on one or more pumping scenarios.

Additionally, the modeling results presented for Dry Valley state that "proposed pumping would eventually result in complete dewatering of the entire aquifer, except that portion within 500 feet of the state line." This proposed pumping cannot, based on the evidence presented, be conducted without bringing about an undesired result (i.e. dewatering of the aquifer).

14 - 9 The mitigation and monitoring referred to on page S-8 of the Summary of the DEIS and proposed in the DEIS is not sufficient and does not contain any suggested actual thresholds or required actions. A water monitoring plan must be developed in consultation with the Nevada State Engineer prior to issuance of the NOD by BLM and the cooperating agencies. If the Nevada State Engineer does not agree to implement the mitigation monitoring and reporting program, then BLM should not issue the ROD. As we stated in our letter dated March 25, 2005, Lassen County as a cooperating agency has requested that a mitigation, monitoring and reporting program be included in the EIS as follows:

> The preliminary DEIS needs to describe the program that will be developed to monitor water level drawdown, impacts to habitat (both direct and indirect), and water quality migration in the vicinity of the production wells and along the California/Nevada Border. This program should include monitoring wells in both aquifer layers 1 and 2, as well as the measuring and sampling protocols. Wells, springs, seeps, and wetlands which could potentially be affected by water table drawdown and or changes water quality should also be monitored. Specific mitigation measures and a schedule for implementation should be outlined. Impact threshold criteria should be established which will identify groundwater levels that will trigger protective enforcement actions. Contingency measures should be identified should specific measures fail to meet performance criteria. The agency, individual or successor who will bear the costs of the mitigation and monitoring program also needs to be identified. Additionally, parties responsible for monitoring and enforcement should also be identified.

In reference to page 4-19 "…arsenic is elevated (0.039 mg/L versus standard of 0.01 mg/L to be implemented January 2006) in the well located nearest the playa (Wilson Well)." The DEIS does not mention a water quality treatment facility beyond
14 -10 – disinfection and chlorination. Mitigation and monitoring measures need to be included with this EIS to explain what will be done if water quality does not meet EPA drinking water standards.

It is understood by Lassen County that BLM has no jurisdiction over pumping and monitoring of groundwater, but BLM does have the authority to approve the right-of-way project (pipeline). Such a project should not proceed without consideration of cumulative
14 - 11 impacts, especially those associated with groundwater availability and associated impacts to springs, seeps and wells. Prior to filing the Record of Decision, BLM should take care to certify that the groundwater supply is adequate to support the project. This would include using best available data to determine that groundwater mining will not take place and the development of a thorough monitoring/mitigation plan in conjunction with the cooperating agencies and the Nevada State Engineer.

14 – 9
See Response 14-1.

14 – 10
No water treatment has been identified as being necessary for these water sources. Drinking water standards are enforced by the State of Nevada and Washoe County.

14 – 11
Comment noted. See also Response 14-1.

It is Lassen County's expectation that our role as a cooperating agency in providing our scoping comments of January 13, 2004, together with comments on the Preliminary DEIS dated March 25, 2005, and the above comments will constructively assist the Carson City Office, BLM, to prepare an adequate and useful document for consideration of the North Valleys Water Project.

If you have any questions, or wish to discuss these comments further, please contact Robert K. Sorvaag, Director, or Anna Petersen, Associate Planner, Community Development Department, 707 Nevada Street, Suite 5, Susanville, CA 96130, (530) 251-8269.

Sincerely,

LLOYD I. KEEFER, Chairman
Lassen County Board of Supervisors

LIK:RKS:nes
Attachment

cc: Senator Dianne Feinstein, United States Senate
Senator Barbara Boxer, United States Senate
Senator Harry Reid, United States Senate
Senator John Ensign, United States Senate
Representative John T. Doolittle, United States House of Representatives
Representative Jim Gibbons, United States House of Representatives
Senator Dave Cox, California State Senate
Assemblyman Rick Keene, California State Assembly
George Benesch, Esquire, Special Counsel to Lassen County
Dayne Barron, Field Manager, Eagle Lake Field Office, Bureau of Land Management
Steve Bradhurst, Director, Washoe County Department of Water Resources
Adrian P. Freund, Director, Washoe County Community Development Department
Don Koch, Regional Manager, Region 1, California Dept. of Fish and Game
Hugh Ricci, P.E., Nevada State Engineer
Dwight Russell, Northern District Chief, California Dept. of Water Resources
Harold J. Singer, Executive Officer, Lahontan Regional Water Quality Control Board
Katy Singlaub, County Manager, Washoe County Managers Office
Vince J. Sabatino, Civilian Executive Assistant, Sierra Army Depot
Joe Willliams, Manager, Herlong Utilities Cooperative

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Letter 15

The Toiyabe Chapter of the Sierra Club

Nevada and Eastern California

PO Box 8096, Reno, NV 89507

One Earth,
One Chance.

July 20, 2005

Terri Knutson
BLM/Carson City F.O.
5665 Morgan Mill Rd.
Carson City, NV 89701

Re: North Valleys Water Projects draft EIS

Dear Ms. Knutson,

On behalf of the Toiyabe Chapter of the Sierra Club and its 6,500+ members in Nevada and the eastern Sierra, I am submitting comments on the draft Environmental Impact Statement (EIS) for the North Valleys Water Projects. We would like to thank you for scheduling a meeting on the draft EIS in Reno on July 6 since we were unaware of the first one. We would also like to thank you for providing the water model which was used to generate graphs, charts, and for the impacts analysis in the dEIS. Unfortunately, we are very disappointed in the draft EIS which we believe has major flaws in complying with NEPA requirements. We strongly recommend that BLM resolve problems with the models used in the dEIS to assess environmental impacts and write another draft EIS.

Our analysis, chapter-by-chapter, of the flawed dEIS is presented below. Attached to our analysis is a separate letter from a professional hydrologist, Dr. Tom Myers, who has reviewed the model information used by the BLM in developing the dEIS. The Sierra Club comments include the attached report by Dr Myers. We summarize some of the points from Dr. Myers report here:

1. The DEIS incorrectly defines perennial yield and in doing so under represents the severe and lasting impacts to public lands of pumping the "perennial yield". Pumping an amount equal to the "perennial yield" allows the permanent loss of springs, seeps, wetlands, and shallow groundwater dependent vegetation.

2. The DEIS incorrectly states "... there is no net removal of groundwater resource" caused by the pumping of an amount of groundwater equivalent to the perennial yield. Pumping an amount equal to the perennial yield does, in fact, result in a decrease in groundwater storage.

3. The BLM appears to ignore its legal responsibility to protect the public land. The agency cannot authorize the degradation of water naturally occuring on public land, yet the DEIS notes that springs, seeps, and wetlands will be eliminated or seriously degraded by groundwater pumping and drawdown

4. The DEIS does not analyze and explain why the Fish Springs ranch spring complex on Fish Springs Ranch is now completely dry and the history of that drying. Existing agricultural pumping of 4,200 AFY (with 1,046 AFY of potential recharge) would appear to have caused the loss of the springs.

5. The DEIS estimates 4,500 af/y of evapotranspiration and outflow will be eliminated due to groundwater pumping, but fails to analyze the loss of wetlands and springs which will be the result.

6. The DEIS relies on an outdated groundwater model for Honey Lake Valley.

7. The DEIS relies on a poorly constructed groundwater model for Dry Valley.

15 - 1 8. The DEIS assumes a State Engineer ruling will be overturned by the court and the proponent will receive a water right in excess of 3 times that already granted for Bedell Flat. The DEIS must have an alternative which follows the State Engineer ruling.

Our specific comments on the dEIS follow:

I. SUMMARY

A. Record of Decision: We appreciate the BLM commitment not to issue a ROD until all other agency special use permits have been secured (p.S-1) . This could be an important constraint, since the proponents do not even have customers for the water, according to the dEIS, and unmitigated impacts of pumping may be severe, resulting in unnecessary and undue degradation of pbulic lands and resources. We were told at the BLM open house that the ROD is also contingent on the various parties agreement on a monitoring and mitigation plan to be submitted to the NV State Engineer. Is this accurate? If so, this constraint should also be stated in the EIS. 15 - 2 Otherwise, the dEIS would fail to require any monitoring or mitigation for avoidable adverse impacts of this proposed federal action.

B. Proposed Action: While the description of the projects in the dEIS limits exported water to 8,000 af/y and 3,500 af/y, one proponent has over 5,000 af/y of additional water rights which could be exported and the other proponent has approval of only 15 - 3 3,144 af/y (p.S-2). Because the impacts analysis is predicated on these amounts, the ROW permit should be issued for these maximum amounts and BLM should state that additional environmental impact analysis, monitoring and mitigation will be required if the proponents seek to transmit water exceeding these amounts.

C. Development Impacts: The dEIS fails to consistently address the total growth impacts of increased population (c. 45,000 to 68,000+) supported by the additional 8,000 + 3,500 af/y on air quality, traffic, infrastructure costs, declaring only benefits from project construction (p.S-2). The dEIS discloses some adverse environmental impacts on water resources (p.S-3), including nitrate loading from septic systems, erosion/sedimentation from housing and business development projects and surface 15 - 4 water runoff from impervious surfaces (p.S-3), but does not address increased auto emissions from increased population and traffic, direct increased water pollution from

15 – 1

Intermountain Water Supply is re-applying for a 356 af/yr water right to the State Engineer to add to the already approved 144 af/yr. Since 500 af/yr represents the Proposed Action for Intermountain Water Supply, potential impacts associated with pumping this amount of water are disclosed in the Draft and Final EIS. Pumping water less than 500 af/yr would result in reduced impacts compared to those disclosed in the EIS.

15 - 2

See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) as part of this Final EIS. Also see revised Table 1-1 (Regulatory Responsibilities) for a listing of agencies that have authority over the various permits associated with the proposed Projects.

15 – 3

The current pipeline design and configuration would allow water transmission up to 8,000 af/yr for Fish Springs Ranch, and up to 3,500 af/yr for Intermountain Water Supply. To increase the volume of water delivery through the pipelines would require additional pump facilities and associated infrastructure be added to the pipeline system(s). The addition of these facilities would require review by local governmental entities and/or BLM.

15 – 4

See revised text under *Cumulative Effects* section and *Direct and Indirect Impacts* section for each resource in Chapter 4 of this Final EIS.

proposed highly mineralized water production wells or indirect pollution from introducing increased levels of TDS into the Truckee River from additional effluent loads.

15 - 5 D. Groundwater Withdrawal Impacts on California: Contrary to the statement on p.S2, the Nevada State Engineer did not deal with the impacts of groundwater withdrawal in Nevada on adjacent areas in California, even though the two states share the groundwater basin as Nevada State Water Law does not apply to California. Nor have the concerns about potential impacts to California by Lassen County been resolved in the draft EIS, despite the county being a cooperating agency (letter of June 13, 2005).

15 - 6 E. Range of Alternatives: The dEIS fails totally to provide a reasonable range of alternatives (p.S-2). There are only 2 alternatives analyzed, either issue the ROW permit or not issue the permit. No attempt was made to analyze alternatives with less adverse environmental impacts, despite public scoping comments.

F. Impacts Analysis:

15 - 7 1. Air Resources: The dEIS fails to analyze the impacts on air quality in the Truckee Meadows of the additional 45,000 to 68,000 population supported by the exported water (p.S-3).

15 - 8 2. Water Resources: The dEIS fails to quantify the effects of groundwater pumping on water quantity and quality, on wetlands, on springs and seeps, on land subsidence, on changes in salinity and TDS as well as the toxic plumes from the Herlong base from incursion into or towards the cones of depression of the production wells at Fish Springs Ranch and on air quality from areas denuded of vegetation by groundtable lowering in Dry Valley below the plant extinction depths; the dEIS fails to require monitoring or mitigation to quantify, avoid, or minimize these adverse environmental impacts (p.S-3).

15 - 9 3. Vegetation: The dEIS fails to quantify the potential for increased proliferation and spread of noxious weeds and other invasive species (p.S-4) from the water projects. It also fails to require monitoring and mitigation to avoid, reduce or minimize this adverse impact.

15 - 10 4. Insufficient Analysis: The dEIS fails to require adequate studies of ground water pumping to be able to quantify impacts on jurisdictional and non-jurisdictional wetland areas (p.S-4), citing only ...uncertainty determining water source for each spring and wetland area (p.S-4). Will the proposed projects damage or eliminate 100% of these critical wildlife areas, 50%, 2% or 0%?

15 - 11 5. Wildlife: The dEIS incorrectly dismisses potential significant impacts to wildlife of the long-term loss of habitat from the proposed projects by declaring that most wildlife species live in sagebrush, grassland and juniper woodlands, apparently not needing to drink water from area springs and seeps which may be eliminated through (unquantified and unmitigated) groundwater pumping impacts. The dEIS does state that the habitats of both the sensitive Sage Grouse and the endangered Carson wandering skipper would be adversely affected, yet proposes no monitoring or mitigation for this habitat loss. The dEIS claims no impacts of either reduced groundwater flows or surface flows to the Truckee River and Pyramid Lake, but omits

15 – 5

It is the BLM's position that potential impacts to the Projects area, including California, resulting from the proposed Projects have been adequately addressed in the EIS. Potential groundwater drawdown in the Projects area, including California, has been modeled and described for proposed pumping in eastern Honey Lake Valley and Dry Valley and Bedell Flat. The *Water Resources* section in Chapter 4 of this Final EIS incorporates changes made to the groundwater model for Dry Valley (i.e., reduced pumping rate to 2,000 af/yr, and increased number of production wells to five).

With respect to proposed pumping by Fish Springs Ranch, the Nevada State Engineer found that groundwater pumping of the safe or perennial yield will not unreasonably lower water tables or effect domestic wells. With respect to environmental impact, the State Engineer found that there was substantial evidence presented to indicate that wildlife would not be impacted as a result of these proposed changes (pumping water from the basin). The State Engineer also found that a minimal loss of wetlands would occur and that alkali flats would not be substantially enlarged resulting in no increase in dust hazards. The Nevada Supreme Court affirmed the ruling of the Nevada State Engineer (see Lassen County Board of Supervisors and Pyramid Lake Tribe v. Washoe County, et al, 112 Nevada 743 (1996); 918 P.2d 697). The case was not appealed and it is the law of Nevada and binding to all parties to the action.

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With respect to the rights-of-way, only limited alternatives could be considered by BLM, one of which was considered in detail in the EIS (Alternative A), and others that were considered but eliminated from detailed analysis (justification in Chapter 2). BLM's Records-of-Decisions (RODs) for the Projects will include mitigation measures and/or stipulations to address potential environmental effects.

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See Response 1-20 and Response 1-22 regarding impacts on air quality.

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The BLM believes that Chapter 4 of the EIS adequately addresses potential impacts to water, riparian habitat, and air resources. See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) as part of this Final EIS.

15 – 9

Potential movement of weedy plant species from reclaimed areas to adjacent stands of native vegetation is qualified in the *Vegetation Resources* section of Chapter 4 in the EIS. It is difficult to quantify potential spread of noxious weeds due to a variety of factors during construction and reclamation activities for disturbed areas. This section of Chapter 4 also describes monitoring and mitigation measures for noxious weeds.

15 – 10

Potential impacts to riparian or wetland-type habitat are described in the *Water Resources* and *Vegetation Resources* sections of Chapter 4 in the EIS. These sections of the Final EIS have revised text that better quantifies potential impacts to riparian habitat resulting from groundwater withdrawal.

15 – 11

Potential impacts to wildlife from loss of habitat, especially resulting from loss of springs and associated riparian habitat, is addressed by the statement in the *Wildlife Resources* section of Chapter 4: "From a regional perspective, the spring and riparian areas that could be affected by production well pumping would be minor, and numerous other surface water sites in the Study Area would not be affected by the proposed pumping."

See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) as part of this Final EIS, which addresses springs and riparian habitat areas. Also see revised text under *Cumulative Effects* section and the *Direct and Indirect Impacts* section for *Water Resources, Vegetation Resources,* and *Wildlife Resources* in Chapter 4 of this Final EIS.

any discussion of increased TDS levels in the Truckee River from effluent discharge from the water projects 8,000+3,500 af/y increase in water supply.

15 - 12 6. Social and Economic Resources: The dEIS fails to adequately analyze the impacts of the proposed projects on community costs, citing only benefits from construction jobs and developments in the north valleys. Nor does the dEIS analyze the losses of existing and potential agriculture and development in Honey Lake Valley and adjacent areas through the exportation of its groundwater.

II. CHAPTER 1

A. Introduction: The dEIS has lumped two very different water projects into one document (pp.1-1&2). One project has 8,000 af/y of water rights approved by the State Engineer; the other does not have 3,500 af/y of water rights approved by the State Engineer. Water models predict drawdowns at 100 years by one project not to exceed 30 feet, while drawdowns from the other project exceed 1,200 feet - a number which calls into serious question the actual availability of ground water in Dry Valley, much less the potential adverse environmental impacts of such excessive and unsustainable drawdowns. While we question the precise model predictions (see our comments on the water model), the differences in scale of expected drawdowns are enormous. 15 - 13 While we agree that putting two water pipelines into one ROW would tend to reduce pipeline construction impacts, we do not understand why BLM has reduced its options to ROW approval for both projects or no projects. BLM must be able to approve or reject the ROW applications for one or both projects, since they are separable and each may or may not meet BLM criteria for ROW issuance.

B. Authorizing actions: The dEIS states (p.1-5) that the BLM decision options on ROW applications include:

- o approving the projects as submitted
- o approving alternatives to the project to mitigate environmental impacts
- o approving the projects with stipulations to mitigate environmental impacts
- o rejecting the projects

The BLM appears to have selected only the first and fourth decision options - approve the projects as submitted or reject the projects. The dEIS fails to consider an alternative to mitigate the environmental impacts or an alternative with stipulations to 15 - 14 mitigate environmental impacts. We request the BLM to remedy this omission and to consider both the second and third alternatives as options in another draft EIS.

C. BLM commitment to mitigation and monitoring measures: The dEIS states (p.1-5) that:

> mitigation and monitoring measures developed by BLM and cooperating agencies during the EIS process to address potential impacts of the projects on groundwater and surface water features would be submitted to the Nevada State Engineer for inclusion in a monitoring/mitigation plan.

While this statement sounds like this could be a process to meet the BLM s

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See revised text under *Cumulative Effects* section and the Direct and Indirect Impacts section for the *Social and Economic Resources* section in Chapter 4 of this Final EIS for an expanded discussion of potential impacts in the service area. A summary of the Fish Springs Ranch plan for ranch conversion has been added to the *Proposed Actions* section in Chapter 2 of this Final EIS. With respect to proposed pumping by Fish Springs Ranch, the Nevada State Engineer found that groundwater pumping of the safe or perennial yield (13,000 af/yr) will not unreasonably lower water tables or effect domestic wells.

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There will be two separate Records-of-Decision (RODs) issued by BLM for the proposed Projects: one for Fish Springs Ranch (eastern Honey Lake Valley) and the other for Intermountain Water Supply (Dry Valley and Bedell Flat).

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The BLM considered all four decision options for the proposed water transmission pipelines rights-of-way projects. One alternative was considered in detail in Chapter 2 of the EIS (Alternative A), and others were considered but eliminated from detailed analysis. See Response 15-6.

obligations for monitoring and mitigation for federal actions with adverse environmental impacts, it is not an actual BLM commitment to monitoring and mitigation. Are proponents and the public included in the development of the monitoring and mitigation plan? In any event, the BLM and cooperating agencies

15 - 15 may not agree on monitoring and mitigation recommendations. And, the NV State Engineer many not accept these mitigation and monitoring recommendations. Please explain.

D. Terms and conditions of ROW: The dEIS states (p.1-6) that ROW requirements include:

> terms and conditions to minimize damage to scenic and aesthetic values, protect fish and wildlife habitat, protect the environment, and assure compliance with applicable air and water quality standards.

It appears that BLM has decided that it has no obligation to include such terms and conditions in the ROW permit, abdicating the responsibility to the Nevada State Engineer and the Truckee Meadows Regional Planning Agency for water resources, air and water quality, fish and wildlife habitat, and environmental protection as well as

15 - 16 for all monitoring and mitigation measures for project impacts. Please explain.

E. Public scoping: The Sierra Club greatly appreciates BLM including Table1-2 which presents a summary of the scoping comments and references to the applicable EIS sections (p.1-10 to 16). It clearly documents the extensive public interest in and general and specific concerns about the proposed projects and facilitates the review of the dEIS. Unfortunately, the dEIS substantively addresses very few of these scoping comments. Despite references to EIS chapters, the BLM does not specifically address each of these public scoping comments

III. CHAPTER 2

A. Department of Interior actions on previous EIS: The dEIS (p.2-3) states that the Secretary of the Department of Interior suspended the work on a previous water project EIS in 1994, pending resolution of the following issues:

1. concurrence of USGS on regional groundwater modeling: the dEIS states that

15 - 17 groundwater modeling has been completed with the US Geological Survey review. Does this modeling and review constitute the regional groundwater modeling and USGS concurrence required by the Department of Interior? There remains much disagreement about the various models as well as the modeling results. In addition,

15 - 18 the dEIS states that it does not have sufficient information on proposed pumping and the underlying aquifers to be able to quantify impacts to springs and wetlands. Please explain.

2. Sierra Army Depot groundwater contamination: the dEIS (p.2-3) states that Sierra Army Depot has developed and implemented a groundwater control and treatment

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BLM and cooperating agencies met on August 18, 2005 to discuss and develop the *Recommended Water Resources Monitoring and Management Plan* for the North Valleys Projects that is presented in Appendix D of the Final EIS.

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See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) as part of this Final EIS, which includes monitoring for groundwater levels and quality, flow and quality of springs, and characteristics of riparian areas.

15 – 17

The USGS, as a cooperating agency, reviewed and commented on the groundwater models most recently completed for Honey Lake Valley, Dry Valley, and Bedell Flat. Even though the USGS had critical comments about the models, their general conclusion is that the modeling efforts are valid. The history of Honey Lake Valley models and criticisms demonstrates that models are tools that can be subject to a variety of assumptions and interpretations. Models rely on inputs of available geologic and hydrologic data, the extent of which should be sufficient to adequately represent and predict site-specific conditions. It can be argued that there are not sufficient data to get reasonable model results because there are no rules that specify how much data are enough. Best professional judgment is used by persons who are experienced with the models. This was done for the North Valleys Rights-of-Way Projects EIS.

15 – 18

For the proposed groundwater pumping projects, it is BLM's position that the data are adequate for purposes of predicting effects from pumping. The uncertainty associated with quantifying effects to specific springs and riparian or wetland-type habitat is related to whether the water sources for these features are from the regional aquifer for which the water table would be lowered by the proposed pumping projects. Many springs in the Projects area are located in or near the mountains for which the source water is relatively shallow groundwater and surface water that would not be affected by proposed pumping. Chapter 4 of the Final EIS includes best professional judgment as to whether specific springs and flowing wells could be affected by proposed groundwater pumping. A monitoring and management plan would be implemented to address uncertainties about the effects of pumping (see Appendix D in Final EIS for the recommended plan).

program to address contamination at that site. We could not find a reference to the program in Chapter 6, nor could we find the program in any of the appendices.

As the BLM must know, the Sierra Army Depot (SIAD) was a munitions disposal site for the US Army for over 30 years, engaging in open burning of munitions. This process released many toxic and carcinogenic chemicals into the air, land and water, including but not limited to: lead, mercury, arsenic, antimony, beryllium, cadmium, nickel, heavy metals, PCB, and fiberglass and dioxins. The pollution was spread by the wind into Nevada at least 15 miles and as far as 40 miles from the explosion sites. Contamination was confirmed by the US District Court in Sacramento as a result of a lawsuit filed by environmentalists, Native Americans and local residents.

15 - 19 Since there is little information on the Sierra Army Depot s program in the dEIS, we cannot determine whether contamination issues have been addressed at all. These include but are not limited to: Will the importation of water from this region negatively impact the health of Washoe County and Lassen County residents? Will imported water be dispersing contaminates into our environment? Will contaminates be drawn from the imported water into our water supplies in 5, 10, or 20 years? Have surface water and groundwater been contaminated by the SIAD toxics? Have other maladies besides cancer, particularly autoimmune diseases (such as Lupus), birth defects, respiratory ailments, and attention deficit disorders, been detected in surrounding and downwind communities at higher-than-normal rates? Will we see an increase in these diseases in Washoe County and Lassen County? What are the current locations of the SIAD toxic plumes and how quickly will the contaminated groundwater be drawn into the cones of depression from the proposed Fish Springs Ranch pumping of 8,000 af/y? The dEIS fails to address past and current pollution for the Sierra Army Depot including a description of Installation Restoration Program clean up and current levels of contamination at the base. The potential for a drawdown of these contaminates, including depleted uranium and other radioactive materials, as a result of proposed Fish Springs Ranch production wells must be addressed.

15 - 20 An assertion in the dEIS (p.4-19) that ...results of the 2004 groundwater model for Fish Springs Ranch pumping shows that no drawdown would occur in the Sierra Army Deport area at a pumping rate of 8,000 af/y must be fully documented and disclosed in the EIS. Figure 4-1 does not show the locations, directions of flow, or rates of flow of the toxic plumes originating in the Sierra Army Depot.

15 - 21 Likewise, the dEIS discloses (p.4-19) US Army concerns that groundwater pumping at Fish Springs Ranch could adversely affect groundwater remediation activities at the Sierra Army Depot and reports that groundwater contamination studies and remediation activities have been ongoing for over 10 years. Unfortunately, the dEIS is silent on whether Army concerns have been addressed or whether remediation activities have been successful or not. Please provide more information on this critical public health and safety issue.

3. concurrence from the Pyramid Lake Paiute Tribe on Trust Responsibility issues:

15 – 19
As stated on page 4-19 of the Draft EIS, "Results of the 2004 groundwater model for Fish Springs Ranch pumping shows that no drawdown would occur in the Sierra Army Depot area at a pumping rate of 8,000 af/yr (Figure 4-1)." Remediation efforts at the Depot are ongoing and can be assessed from various reports available from the Depot and at the Reno public library. Locations of groundwater contamination plumes at the Depot are approximately 1 to 2 miles west of the predicted maximum extent of groundwater drawdown resulting from Fish Springs Ranch pumping at 8,000 af/yr. See revised text in the *Water Resources* section of Chapter 4 in this Final EIS for updated information about groundwater conditions at the Sierra Army Depot.

15 – 20
See Response 15-19.

15 – 21
See Response 15-19. The Sierra Army Depot is a cooperating agency for the North Valleys Projects EIS.

15 - 22 the dEIS states (p.2-3) that Trust Responsibility issues have been addressed as a result of reduced groundwater pumping rates included in Fish Springs Ranch s proposed project. The dEIS fails to document concurrence from the Pyramid Lake Paiute Tribe to reduced groundwater pumping rates in Fish Springs Ranch constituting BLM compliance with Indian Trust Responsibility requirements or the absence of any environmental effects of the proposed projects on the tribe. Other outstanding issues raised by the tribe in 1994 include SIAD contamination of land and water and increasing levels of TDS in the Truckee River from the effluent from use of the imported groundwater being discharged into the Truckee River and Pyramid Lake.

15 - 23 The dEIS also states (p.3-85) that the BLM must: 1. clearly state the rationale for the recommended decision and 2. explain how the decision will be consistent with BLM s trust responsibility. Please provide the rationale and explanation required. The dEIS must fully document resolution of these three DOI issues.

15 - 24 B. GROUNDWATER MONITORING-FSR: The dEIS (p.2-18 to 21) describes proposed and existing monitoring of groundwater, apparently by the project proponent, not by the BLM or an independent, third party, in order to ...document changes that occur in groundwater levels and quality in the eastern Honey lake Valley area. The monitoring would ... document changes that may be caused by the transition to a municipal well field.. and be ...used for well field management and model validation. Would the monitoring data be used to reduce pumping below the 8,000 af/y? If the monitoring data invalidates the model predictions and impacts are more severe than those predicted, will BLM withdraw the ROW permit for the projects? Has the Nevada State Engineer approved FSR s proposed monitoring program? Please explain.

15 - 25 C. VEGETATION MONITORING-FSR: The dEIS (p.2-21) describes proposed vegetation monitoring, apparently by Fish Springs Ranch, for a period of 2 years. Since no mitigation is required for failed revegetation or noxious weed invasion into disturbed areas, what is the purpose of the monitoring? Since re-establishment of vegetation in the Great Basin often takes much longer than two years, why is the period of monitoring so short? Is this section of the dEIS supposed to be connected to the section on Reclamation (p.2-21)?

15 - 26 D. RECLAMATION-FSR: While we can support standard BLM requirements for reclamation of public lands disturbed by project construction activities, we are dismayed by BLM s total lack of responsibility for avoiding or remediating project impacts on springs, wetlands, seeps and other critical components of wildlife habitat. (See comments in 6.D. and 6.E.)

E. GROUNDWATER MONITORING - Intermountain Water Supply (IWS): apparently, the project proponent has no monitoring proposal (p.2-22) as the dEIS states (p.2-22) that The Nevada State Engineer would require IWS to develop a plan to monitor potential impacts to groundwater resources in Dry Valley and Bedell Flat. The dEIS states that IWS <u>would</u> implement one or more of the following monitoring and mitigation measures should monitoring of groundwater levels in Dry Valley...identify

15 – 22

See Response 15-5 for information about the Nevada State Engineer and State Supreme court rulings regarding proposed pumping at Fish Springs Ranch.

15 – 23

BLM believes that the Draft and Final EIS adequately describe potential impacts to the Pyramid Lake Paiute Tribe, rationale for the agency preferred alternative, and how this decision is consistent with BLM's trust responsibility. The Tribe is a cooperating agency for the North Valleys Projects EIS. Appendix D in this Final EIS contains a *Recommended Water Resources Monitoring and Management Plan* that will provide for an ongoing evaluation of potential impacts to Tribal land.

15 – 24

See Responses 15-15 and 15-16. The *Recommended Water Resources Monitoring and Management Plan* contained in Appendix D has been submitted to the Nevada State Engineer for approval. It is not expected that BLM would withdraw the right-of-way permit if impacts are more severe than predicted; in this case, one or more mitigation measures would be implemented to reduce the impacts, as per requirements of the Nevada State Engineer.

15 – 25

As stated in the Draft EIS, vegetation monitoring would be performed for a <u>minimum</u> of 2 years following construction. This vegetation monitoring section is to be connected to the *Reclamation* section in Chapter 2 of the EIS. Therefore, the Final EIS includes a reference to the *Reclamation* section.

15 – 26

Comment noted. See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) as part of this Final EIS, which includes monitoring for groundwater levels and quality, flow and quality of springs, and characteristics of riparian areas.

conditions that impair the long-term yield of the aquifer.

15 - 27 How does the BLM know with such certainty that IWS would take the actions following this statement? Where did these mitigation measures come from? Has the Nevada State Engineer already required these mitigation measures for pumping in Dry Valley and Bedell Flat? Why are they included in the dEIS if the BLM has no intention or authority to enforce them and has no certain knowledge that these measures will be required by some other agency or will be enforced by some other agency?

15 - 28 Is it reasonable for the BLM to determine in this EIS that predicted drawdowns of over 1,200 feet in Dry Valley are sustainable, would not cause undue and unnecessary damage to public lands and resources, and the proponent should receive a ROW permit? Please explain.

15 - 29 The dEIS states that the huge drawdowns in Dry Valley may require additional wellfields, but did not attempt to analyse the environmental impacts of any additional necessary facilities. Please explain.

F. RECLAMATION - IWS: this section in the dEIS (p.2-23) is even more questionable as the enormous predicted drawdowns from pumping 3,000 af/y in Dry Valley would lower water tables far below the roots of existing vegetation, leaving large areas of bare ground or ground covered by annuals or most likely weeds, plants dependent on temporarily moist surface soils. Likewise, the information on acres of expected

15 - 30 disturbances in Table 2-1 (p.2-37) incorrectly omits lands which would be denuded of plants from pumping impacts in Dry Valley. Please explain.

G. The dEIS is silent on whether the two pipelines would be constructed at the same time or sequentially. If sequentially, initial revegetation and reclamation efforts may

15 - 31 be totally destroyed by subsequent construction. The dEIS does not attempt to assess environmental impacts of sequential pipeline construction. Please explain.

15 - 32 H. ALTERNATIVES: The dEIS analysis of eliminated alternatives (p.2-37 to 41) only involves alternative pipeline corridor routes, not alternatives to reduce or mitigate project impacts (see comment I.5.) and does not justify BLM not considering substantive alternatives to the proposed action than ROW and no ROW.

IV. CHAPTER 3

A. AIR QUALITY: The dEIS states (pp.3-10 to 11) that Washoe County is designated as non-attainment area for CO2 and portions of the county are designated as non-attainment areas for ozone and PM10. Yet the BLM has missed any connections between an additional population of 45,000-68,000+ people which would be

15 - 33 supported by the increased water supply from these proposed projects and which would increase air pollution. Please explain.

B. GROUNDWATER QUANTITY-FWR: The dEIS discusses (p.3-21 to 27) the

15 – 27

See Response 15-26. Resource monitoring activities contained in Chapter 2 of the Draft EIS were proposed by Fish Springs Ranch and Intermountain Water Company. The Final EIS has been revised such that Chapter 2 contains monitoring activities that the proponents would perform for the water transmission pipelines rights-of-way. Recommended monitoring and management measures related to groundwater pumping are contained in new Appendix D of the Final EIS. A committee would be established to evaluate monitoring data to help determine whether any adverse effects are a result of pumping by the Proponent(s). The Nevada State Engineer has authority to require mitigation, as necessary, for adverse effects resulting from groundwater pumping.

15 – 28

BLM would grant the right-of-way permit only after completion of the Final EIS and all necessary permits from other agencies have been granted. At that time, BLM would issue RODs for preferred alternatives, including any specific monitoring and mitigation measures, or stipulations that would prevent adverse impacts to public land and resources. The Proposed Action for Intermountain Water Supply in Dry Valley has changed in the Final EIS – the project would be completed in two stages: (1) construct three or four wells in Dry Valley and pump up to 1,500 af/yr; and (2) construct one or two more wells and pump an additional 500 af/yr if adverse groundwater drawdown does not occur from the pumping of 1,500 af/yr.

15 – 29

See revised text and model in the *Water Resources* section of Chapter 4 of this Final EIS. The Proposed Action for Dry Valley has changed to pump 2,000 af/yr from five wells, rather than the two wells specified in the Draft EIS.

15 – 30

Reclamation sections and Table 2-1 in Chapter 2 of the Final EIS address only direct disturbance associated with construction of the water transmission pipelines and associated facilities. S*oil Resources* and *Vegetation Resources* sections of Chapter 4 in the Final EIS describe potential indirect effects on vegetation from proposed groundwater pumping.

15 – 31

The BLM will issue two RODs for the North Valleys Projects – one for Fish Springs Ranch (eastern Honey Lake Valley) and the other for Intermountain Water Supply (Dry Valley and Bedell Flat). Regardless of whether the pipelines would be constructed at the same time or sequentially, proponents would have to meet reclamation requirements established by the BLM for public land, and by Washoe County for the remainder of the pipeline corridors.

15 – 32

Comment noted. See Response 15-6.

15 – 33

See Response 1-20.

availability of groundwater in the project area, including recharge and discharge and perennial yield. It acknowledges disagreements over the accuracy of the 1990 USGS water model by Lassen County and others.

15 - 34 The BLM has failed to resolve these disagreements or to require additional water studies necessary to resolve problems with the water model, even among cooperating agencies, much less the public which is also concerned with BLM reliance on flawed water models and data for its analysis of environmental impacts of proposed pumping. The BLM has also failed to require water studies and modeling to assess which springs would be impacted by the groundwater pumping, rates of impacts, etc. Please see attached report by Tom Myers for a detailed description of the problems with the water models used in the dEIS. These flaws have resulted in an incomplete and unreliable assessment of environmental impacts of the proposals, failing to meet NEPA requirements. Please explain.

15 – 35 Likewise, the BLM has failed to disclose critical information about groundwater flows and the toxic plumes on the Sierra Army Depot, which may be drawn to the cones of depression from proposed FSR project pumping, entering into potential M&I water supplies for the north valleys. (See comments in III.A.2). Please explain.

C. GROUNDWATER QUANTITY-IWS:

See attached comments by Tom Myers on problems with the IWS water model.

15 - 36 D. GROUNDWATER QUALITY-FSR: The dEIS describes (p.3-16) elevated levels of total dissolved solids (TDS), yet BLM finds no potential for increased water pollution from the use of this imported groundwater in the Truckee River and its basin. Please explain.

15 - 37 Also, the dEIS does not explain how groundwater from wells with elevated arsenic levels (Table 3-4) would not contaminate the proposed MUI exported water. Please explain.

15 - 38 Most egregious is the omission from this dEIS of any explanation of how groundwater contaminated by open munitions burning and buried toxic materials (p.3-33) would not contaminate proposed exported water. Please explain.

15 - 39 E. GROUNDWATER QUALITY-IWS: The dEIS describes (Table 3-4) elevated levels of TDS, and manganese in groundwater in this project area, but fails to explain how the exported water would not be contaminated. Please explain.

15 - 40 F. SOIL EROSION HAZARD: The dEIS states (p.3-39) that natural soil erosion is generally slight to moderate, but does not consider increased wind erosion of areas denuded by loss of plants due to dropping water tables, especially in Dry Valley. Please explain.

15 - 34
Comment noted. For the proposed groundwater pumping projects, it is BLM's position that the data are adequate for purposes of predicting effects from pumping. See Response 15-5.

15 - 35
See Response 15-19.

15 - 36
See revised text under *Cumulative Effects* section and the Direct and Indirect Impacts section for *Water Resources* in Chapter 4 of this Final EIS for an expanded discussion of potential impacts in the service area.

15 - 37
Water delivered in the transmission pipelines would need to meet applicable water quality standards. With respect to arsenic or other constituents, if any well exceeds the water quality standard, blending of this water with other wells in the system would likely reduce overall concentrations such that the standard(s) would be met. If not, treatment would be required.

15 - 38
See Response 15-19. Existing water quality data show no effects on groundwater outside of the Sierra Army Depot area.

15 - 39
See Response 15-37.

15 - 40
See Response 15-30. Text has been revised in the *Soil Resources* section of Chapter 4 in this Final EIS to describe potential soil effects due to loss of plants by lowered groundwater levels.

V. CHAPTER 4

A. GEOLOGY, MINERALS, AND PALEONTOLOGY: The dEIS states (p.4-3) that all construction practices would be conducted using best management practices including appropriate pipe design and engineering techniques in accordance with all

15 - 41 relevant codes. Whose best management practices? Who will enforce this requirement? On p.4-3, the dEIS also states that

> subsidence zones would be reviewed to determine whether surface features or infrastructure would require remediation based on soil consolidation and surface effects.

15 – 42 Who will conduct this review? Who will enforce remediation requirements?

B. AIR RESOURCES: Why was any disclosure (p.4-5) of particulate and other emissions from areas denuded of vegetation by dropping groundwater tables due to

15 - 43 proposed project pumping omitted from the dEIS? Why was any disclosure of increased air pollution generated by an increased population of 45,000-68,000+ supported by the proposed project s exported groundwater omitted from the dEIS?

C. WATER RESOURCES:

1. MODELING: See attached report by Tom Myers on problems with the water models used in the EIS.

2. IMPACTS TO SPRINGS AND FLOWING WELLS-FSR: The dEIS discloses (p.4-22) that reduced flows in many springs and wetlands could occur due to FWR pumping. However, the BLM apparently dodges the issue of the potential significance of reduced flows and any necessity for avoidance, minimization or mitigation of adverse impacts of the proposed project with the following statement:

> Due to uncertainty associated with groundwater model results and the degree of groundwater connection with springs, flowing wells, and wetland areas (i.e., groundwater that could be lowered due to proposed production well pumping), it is not possible to accurately quantify the magnitude of impact, if any, that could occur over time to these springs and flowing wells.

The purpose of the EIS is to disclose impacts of proposed federal actions, to prevent undue and unnecessary degradation to public lands and resources, and to mitigate unavoidable impacts. If the BLM does not have adequate data on which to quantify the

15 - 44 potential impacts, then the missing data must be obtained. It is unacceptable for BLM to excuse not quantifying potential impacts by not obtaining sufficient data.

Allowing perennial springs to be eliminated or severely degraded by groundwater

15 - 45 pumping and drawdown in many valleys is contrary to BLM responsibilities for Public Water Supplies. Many of these springs or waterholes are reserved for public use by Public Water Reserve No. 107 (Executive Order of April 17, 1926). Please explain.

15 – 41

"Best management practices" as used in the EIS is a generic term referring to commonly used practices for project design, construction, and reclamation that minimize adverse effects to the environment. Project proponents would implement these practices as needed. BLM is responsible for ensuring these practices are implemented on public land, and Washoe County would have similar responsibilities on private land.

15 – 42

See Response 15-41.

15 – 43

Text has been revised in the *Air Resources* section of Chapter 4 in this Final EIS to describe potential air quality effects due to loss of plants by lowered groundwater levels. The *Direct and Indirect Impacts* section of *Air Resources* in Chapter 4 of this Final EIS also has been revised to discuss potential air quality effects in the Service Area.

15 – 44

With respect to potential impacts to springs, flowing wells, and/or riparian habitat, text has been revised in the Final EIS (see *Water Resources* and *Vegetation Resources* sections in Chapter 4) regarding better quantification of potential impacts. With respect to potential impacts to groundwater flow from Dry Valley to Warm Springs Valley (including Winnemucca Valley) and/or Honey Lake Valley, the absence of quantifying such impacts is couched with the statement that Interflow Hydrology (2005) and the USGS (Berger et al., 2004) believe that hypothetical groundwater outflow along the Walker Lane fault zone is not supported by the occurrence of springs along the fault zone.

15 – 45

Comment noted. No Public Water Reserves (PWRs) were identified in eastern Honey Lake Valley, Dry Valley, or Bedell Flat; however, some of the springs located on public land could qualify as PWRs by the Nevada State Engineer for purposes of establishing water rights. Public Water Reserve No. 107 relates to a 20-year term on 334.57 acres of land withdrawn for BLM Water Reserve No. 107, all of which are located in Oregon. The Executive Order is site-specific and applies only to land in Oregon.

15 - 46

3. IMPACTS TO SPRINGS-IWS: The dEIS makes the same unacceptable claim (p.4-31) of not enough data to quantify environmental impacts to springs from pumping in Dry Valley. The BLM must obtain sufficient information to quantify these impacts, especially where drawdowns are predicted to be nearly 1500 feet (p.4-29), evaporation would be totally eliminated (p.4-26), and maximum pumping rates could induce reversed groundwater flow from California into Nevada (p.4-26). The same claim is made by BLM for IWS pumping in Bedell Flat (p.4-39) and is equally unacceptable for the reasons stated above. In addition, the dEIS discloses that pumping in Bedell Flat could lower groundwater levels which would affect private domestic and/or irrigation wells located in Warm Springs Valley and Red Rock Valley. Would this be undue and unnecessary degradation and unacceptable to the BLM? Please explain.

15 - 47

4. WATER RESOURCES - MONITORING AND MITIGATION MEASURES: The dEIS discusses (p.4-42 to 45) mitigation measures for water resources. However, the BLM reports that some mitigation measures would occur (for pipeline construction across stream channels and handling of chemicals, fuels, and lubricants), but for water resources, the verbs change. The dEIS makes these kinds of statements: could be monitored, mitigation measures could be implemented, a monitoring plan should be developed, which could include, water level monitoring could continue, groundwater samples could be collected, water table in existing wells in this area should be measured periodically to determine if the magnitude and extent of groundwater drawdown are significant, and impacts to groundwater levels in private domestic wells located...in southern Bedell flat should be evaluated after initiation of production well pumping... and Mitigation would be the responsibility of the pumping well owner or operator whose well is causing the adverse effect. The bottom line appears to be that BLM has decided it has no responsibility to monitor or mitigate adverse impacts of this proposed federal action, contrary to federal laws and regulations. Please explain.

15 - 48

D. VEGETATION: The dEIS states (pp.4-49 to 55) that the proposed project pumping could reduce or eliminate some jurisdictional and non-jurisdictional wetlands, but apparently attempts to excuse the BLM from any responsibility for determining whether these impacts are significant or not by its standard statement of failure to quantify the magnitude of impacts to the wetlands ..because of the uncertainty determining water source for each spring and wetland area. This approach violates BLM s responsibilities for protecting public lands and resources from undue and unnecessary degradation. Please explain.

15 - 49

Again, the monitoring and mitigation section is written theoretically, with language like potential measures to mitigate and monitor for impacts to vegetation include, a vegetation monitoring plan should be developed, and this plan could include... BLM apparently has decided it also has no responsibilities for monitoring and mitigation impacts from the proposed project pumping to vegetation, even vegetation occurring on public lands. Please explain.

15 - 50

15 - 46
See Responses 15-28, 15-29, and 15-44.

15 - 47
Such a decision regarding groundwater drawdown effects on private wells is under the jurisdiction of the Nevada State Engineer. Pursuant to NRS 534.110(4), each right to appropriate groundwater in Nevada carries with it the right to make a reasonable lowering of the static water level at the appropriator's point of diversion. Pursuant to NRS 534.110(5), the Nevada State Engineer may allow, at his discretion, the water level to be lowered at the point of diversion of a prior appropriator so long as the rights of holders of existing appropriations can be satisfied under such express conditions.

15 - 48
See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) as part of this Final EIS, which includes monitoring for groundwater levels and quality; flow and quality of springs, and characteristics of riparian habitat areas.

15 - 49
See Responses 15-10 and 15-18.

15 - 50
See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) as part of this Final EIS, which includes monitoring for groundwater levels and quality; flow and quality of springs, and characteristics of riparian habitat areas.

15 - 51 E. WILDLIFE RESOURCES: While the dEIS acknowledges (pp.4-55 to 65) that the proposed federal action will and could adversely impact wildlife and T&E species in the project area and proposes ...potential monitoring and mitigation measures to help avoid, reduce, or compensate for impacts to wildlife... , the BLM accepts no responsibility for protecting wildlife and wildlife habitat, other public resources, from the effects of the proposed action. Please explain.

15 - 52 F. RECREATION: While the dEIS states that the additional groundwater provided in pipelines through the public lands ROW will result in an additional 45,000-68,000+ population in the north valleys, the dEIS fails to analyze the impacts of the increased population seeking recreation (pp.4-67 to 69) on surrounding public lands, including increased ORV use, hiking, hunting, etc. Why weren t additional impacts on public lands and resources analyzed in the EIS? Please explain.

15 - 53 G. SOCIAL AND ECON0MIC RESOURCES: The dEIS finds only beneficial effects of the proposed federal action (pp.4-79-84), perhaps because it does not discuss the increased costs associated with the expected additional 45,000-68,000+ population. Why weren t increased costs assessed in the EIS? Please explain.

15 - 54 In addition, the dEIS states (p.4-81) that increased development would require ...expansion of existing wastewater treatment facilities, but omits any discussion of costs or where the wastewater would be treated. If treated at the Reno-Sparks Sewage Treatment Plant, the effluent would result in increased TDS loading to the Truckee River and to Pyramid Lake. Please explain why these potential unacceptable (to the Nevada State Engineer s ruling and BLM s Indian Trust responsibilities) impacts were not assessed in the EIS.

E. CUMULATIVE EFFECTS: The dEIS analyzes potential cumulative effects (pp.4-93 to 98) of the proposed federal action.

15 - 55 1. Please explain the statement (p.4-93) that the cumulative effects analysis included in this section does not consider implementation of mitigation measures that may be required by BLM or other agencies that have jurisdiction over the proposed projects.

15 - 56 2. Please explain the statement (p.4-94) that ...it is reasonably foreseeable that importation of water into the North Valleys Planning Area could increase to 13,000 af/y at some point in the future. Would the BLM permit the additional 5,000 af/y to be piped through the ROW across public lands? Would the BLM require additional environmental impact assessment for pumping at the elevated rates? If this is a reasonably foreseeable future action, why didn t the BLM analyze the potential impacts of the additional pumping in this EIS as an additional alternative? Please explain.

3. Proposed Granite Fox Power Plant: The dEIS dismisses any cumulative impacts of a nearby proposed coal-fired power plant with the statement (p.4-96)

15 – 51
See Response 15-11.

15 – 52
See revised text under the *Direct and Indirect Impacts* section for *Recreation* in Chapter 4 of this Final EIS.

15 – 53
See revised text under the *Direct and Indirect Impacts* section and *Cumulative Effects* section for *Social and Economic Resources* in Chapter 4 of this Final EIS.

15 – 54
See revised text under the *Direct and Indirect Impacts* section and *Cumulative Effects* section for *Water Resources* in Chapter 4 of this Final EIS.

15 – 55
Mitigation measures are typically implemented in response to monitoring results that indicate an exceedence of a threshold set by an agency with jurisdiction. Since timing of implementation of any particular mitigation measure is unknown for projects or activities taking place within the cumulative effects area, the ability to analyze the effects of a mitigation measure are not possible, especially in terms of a particular project and the relationship with other projects.

15 – 56
See Response 15-3.

it is uncertain at this time what effect the proposed power plant groundwater withdrawal could have on these adjacent areas (Pyramid Lake Valley and Honey Lake Valley); however, since the power plant would be located in excess of 50 miles north of Fish Springs Ranch eastern Honey Lake Valley well array and the divide between Smoke Creek Desert and Pyramid Lake Valley, BLM has determined that it is unlikely that groundwater withdrawal associated with the proposed power plant would combine to have an additive effect on groundwater flow in either basin.

15 - 57 Attached is a map showing the locations of pending Granite Fox Well applications on the California/Nevada state line in Smoke Creek Valley and along the Smoke Creek Road several miles south of the Smoke Creek Ranch site on the border. None of these locations are ...50 miles north of Fish Springs Ranch. If approved, these wells would be pumping groundwater in the same area analyzed in the dEIS, significantly affecting the results of the impacts analysis in the dEIS. Please re-assess the BLM determination of no additive effects of the Granite Fox groundwater pumping in the same project areas and include in another draft EIS.

15 - 58 4. Social and Economic Resources: The dEIS quotes (p.4-98) a projected total population which could be served through the implementation of the proposed projects as 68,500 residents. On p.4-81, the dEIS states that ...if both projects move forward, 11,500 acre feet of water would be delivered to the North Valleys Planning Area, providing water for approximately 47,800 people... Please explain these discrepancies in expected population increases.

CONCLUSIONS: BLM should start the EIS process over, with water models and data sufficient to characterize existing groundwater and potential impacts of groundwater pumping and exportation. While we agree that BLM is not responsible for groundwater management (state engineer) or growth management (local), the agency is responsible for complying with the requirements of NEPA, including determining the environmental impacts of proposed federal actions. This dEIS fails to comply with NEPA requirements.

Thank you for considering our comments.

Sincerely,

Rose Strickland

Rose Strickland, Chair
Public Lands Committee
Toiyabe Chapter of the Sierra Club

attachments (Tom Myers report of 7/15/05 and Granite Fox water well map)
cc: local, state, and federal agencies

15 – 57

See revised text in the *Water Resources* section of *Cumulative Effects* in Chapter 4 of the Final EIS. Distance from the Fish Springs Ranch wells to the power plant has been changed from 50 miles to 25 miles. It is not possible to quantify additive effects of groundwater pumping that may occur at the Granite Fox Power Plant in Smoke Creek Desert because accurate information is not available regarding aquifers that would be pumped for this proposed project.

15 – 58

See Response 1-25. Discrepancy over the number of residents that could be served by the proposed Projects has been rectified in Chapter 4 of the Final EIS.

Letter 16

Water Resources Scoping Comments
Draft Environmental Impact Statement
North Valleys Rights-of-Way Project

Technical Report 2005-01-North Valleys

July 15, 2005

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Introduction

This report provides comments on the draft environmental impact statement for the project which will develop and transmit water from East Honey Lake, Dry and Bedell Flats Valleys to the North Valleys of Reno. The report is limited to a review of the groundwater impacts due to development of the wells in three basins. The analysis includes an assessment of the impacts and an assessment of the quality of the analyses used to provide the predictions including the groundwater models. The review was limited to the DEIS including appendix C which provides a brief summary of the groundwater models. Reports related to the models were not reviewed.

Groundwater development always impacts surrounding resources. Even so-called sustainable groundwater development means that an aquifer can be pumped indefinitely without a continued lowering of the water table (Bredehoft, 2002). It does not mean that the pumpage will have no effects on the aquifer or associated resources; it means that those effects, no matter how devastating, will eventually level out. Water pumped for development will eventually no longer be discharged from the basin through natural means which means that flow to wetlands and springs will be dried. The proposals here intend to use the entire unappropriated natural recharge, and discharge, from the basin which means that all of the discharge from the basin will cease. Because the natural discharges will continue unaffected for a period along with the pumping, total discharge will exceed natural and induced recharge leading to a loss of groundwater storage, called transitional storage, and a lowered water table.

The water table will be lowered by the removal of transitional storage. The drawdown will be that required to decrease the discharge to springs and evaporation through the playa and wetlands. Flow to surrounding basins will decrease substantially.

16 - 1 The BLM is incorrect in its definition of perennial yield as being the maximum amount of natural groundwater discharge that can be salvaged each year over the long-term by pumping **without bringing about some undesired result** (page 3-23, 4-10, emphasis added). Perennial yield is defined as the amount of water that can be perennial pumped without causing long-term, continuously increasing drawdown; there is no requirement that all potential results be considered for their desirability. Drawdown occurs initially, but as long as the pumpage is less than the natural recharge to the basin, a new steady state condition will be reached. As pointed out by Bredehoft (2002), developing the perennial yield requires taking from natural discharge points and amount of discharge equal to the developed pumpage. Glancy and Rush write:

16 – 1

Comment noted. BLM acknowledges that there are many definitions of "safe yield" or "perennial yield". The definition used in the Draft and Final EIS is from the Nevada State Engineer (1974). The most important part of the definition is "…long-term without bringing about some undesired result." Ultimately, the Nevada State Engineer is responsible for determining the safe yield which is reflected in the water rights granted for a given basin. The definition is now in the *Water Resources* section of Chapter 4 in this Final EIS.

> Perennial yield cannot exceed the natural recharge to an area and ultimately is limited to the maximum amount of natural discharge that can be salvaged for beneficial use. Salvage of natural discharge implies **diversion of ground water presently destined for consumption by native evapotranspirative processes** and part of the subsurface outflow to areas of pumping. (Glancy and Rush, 1968, page 46, emphasis added)

Developing the perennial yield does not prevent undesired results. It depends on how one defines undesired results. The entire discharge from an area can be diverted as long as the drawdown eventually stabilizes. Every spring, wetland and seep can be dried. The BLM should not rely on its faulty definition to assume that the State Engineer has already been assured that significant negative environmental impacts will not occur.

16 -2 The BLM is also wrong to suggest that no net groundwater is removed when perennial yield is pumped. In general, if the volume of groundwater removed from pumping wells and other discharges is equivalent to or less than the groundwater recharge rate within a given basin, then **there is no net removal of the groundwater resource.** (page 4-10, emphasis added) As the water table adjusts to the new steady state, groundwater storage decreases. The difference between the pristine or pre-development water table or potentiometric surface and the post-development level is essentially the water removed by the project. The BLM should fix this statement and change any analysis that depends on it.

As noted throughout the DEIS, the BLM admits that a number of perennial springs will be eliminated or severely degraded by groundwater pumping and drawdown in many of the valleys. For example:

> In 2004, a total of 58 springs were identified by Westech (2004a) within the areas of potential groundwater drawdown resulting from the Proposed Actions. Of these springs, 29 are in Honey Lake Valley, 10 in Dry Valley, and 19 in Bedell Flat (**Figure 3-4**). Flowing wells were included in the spring inventory by Westech (2004a). No springs have been identified along the pipeline rights-of-way in Antelope and Lemmon valleys. (DEIS, page 3-17)

However, the BLM cannot authorize the degradation or appropriation of Public Water Supplies. Many of these springs or waterholes are reserved for public use by Public Water Reserve No. 107 (Executive Order of April 17, 1926). According to the IBLA:

Assuming that the water is a spring and is on public land it would be subject to the Executive Order of April 17, 1926, establishing Public Water Reserve No. 107. The Executive Order withdrew all springs and water holes on public lands and the surrounding acreage [smallest legal subdivision or all lands within one quarter mile for unsurveyed lands]. It was designed to preserve for the general public lands containing water holes and other bodies of water needed or used by the public for water purposes.

<u>Desert Survivors</u>, 80 IBLA 111, 115 (1984).

It should be noted that this withdrawal is still valid; it was not rescinded by FLPMA. Under this Executive Order, the BLM cannot authorize activities that will impair the public use of any of those waters. In this case, the BLM s approval of the water pumpage and other activities that could dry up any springs on public land would be illegal. This is especially true for any springs currently used for stockwatering and other public purposes. Therefore, the BLM can only approve operations that will protect the water levels and uses of these springs.

It is not necessary for a spring to be perennial to be connected to or dependent on the regional groundwater as assumed by the BLM. Springs may depend on a seasonal rise to intersect with the ground level or for an artesian spring to gain enough pressure to discharge at the ground surface. Thus, if pumpage affects the levels in an area of ephemeral springs, it is possible to affect their discharge.

Impacts at Fish Springs Ranch

The project proposes to transfer 8000 af/y from the Fish springs Ranch portion of eastern Honey Lake Valley. This will replace the current 4200 af/y of pumpage from which 1046 af/y is the estimated irrigation return flow. Thus, the proposal will result in an additional 4800 af/y of depletion from the groundwater aquifer in eastern Honey Lake. It appears that the existing pumpage has caused numerous severe impacts which the DEIS does not explain. For example, the Fish Springs complex is dry:

16 – 2

This statement has been revised in the *Water Resources* section of Chapter 4 in this Final EIS.

> The Fish Springs complex located near Fish Spring Ranch currently is dry, but previously flowed at about 1,600 gal/min prior to significant irrigation pumping (Rush and Glancy 1967). In the 1960s when an irrigation well near Fish Springs was pumping 2,000 gal/min for an average of 90 days each year, the flow from Fish Springs declined to about 400 gal/min (Rush and Glancy 1967). (page 3-17)

16 - 3 Washoe County maintained 26 monitoring wells in the vicinity of the Fish Springs Ranch between 1989 and 1999 and there has been 3000 to 5000 af/y of pumpage in the eastern Honey Lake Valley. However, the DEIS does not utilize this information in its attempt to predict the impacts of the proposal. The BLM should redo the DEIS and include an analysis of impacts to date in the vicinity of the ranch.

The DEIS predicts that groundwater evapotranspiration will drop by more than 4000 af/y and that flow to Smoke Creek Desert basin will drop by more than 500 af/y. Neither impact is acceptable because they both represent a substantial depletion of flow to valuable wetlands and springs. It will cause a substantial loss of wetlands and springs.

The BLM relied on an outdated groundwater model for its predictions of future impacts. Lahontan Geoscience adapted a 1990 USGS model (Handman et al, 1990) for current conditions. However, it did very little adapting. It kept the mile square cell sizes for example which is much too small for task considered here. In 1990 when the USGS developed its original model, a mile square was as fine a model as could likely be completed due to computer memory. Lahontan did not adjust the spacing; it adjusted just the general head and evapotranspiration parameters.

The gross discretization limits the precision of the impacts. There is no reason to keep the gross cell sizes. There are many wells in the area from which lithology could be obtained and used to better discretize the geology of the domain; lack of geologic information is not a justification. The models used for the other valleys use a finer discretization with similar information. The model used for a thesis in 2000 used a quarter mile spacing. The current and proposed pumping will likely cause drawdown much greater near the wells than the reported 30 feet. This is because the model in its water balance calculations among cells uses an average across the cell; in this case for the well it spreads the drawdown across a mile rather than at a point as is the case in reality.

16 - 4 Lahontan uses the root mean square and the correlation between pumped and observed heads to justify that the model is still accurate for 2003 conditions. The 4.9 RMSD corresponds to an average residual of about 25 feet; in a system with as little head range as this one, 25 feet is a huge residual. The correlation is meaningless because the correlation could approximate 1 whether all points are almost on the line or if the points are evenly spaced on each side of the line; points below the line counter points above. Inexplicably, the DEIS claims that transient calibration was not completed because of a lack of data. As noted above, Washoe County has maintained monitoring wells in the vicinity of the ranch since 1989; there is also sufficient data on the pumping rates on the ranch. For the consideration of impacts potentially as great as these, it is essential to calibrate the response to stress using as much information as possible.

Lahontan correctly changed model parameters for the evapotranspiration routine. However, Lahontan tested the model s sensitivity to recharge and evapotranspiration and found, unsurprisingly, that it was much more sensitive to recharge. This result is unsurprising because recharge drives the volume of water coursing through the model. Because ET is the discharge from the model, it must approximate the recharge (minus flow through GHBs). Increasing or decreasing recharge changes the driving head for the discharges. However, changing ET parameters will have little effect on the head because the flow through the boundary must remain the same; the proportional changes will be much less.

16 - 5 Because the model is most sensitive to recharge, it is unfortunate that recharge estimates are its weak link. It appears the model, and the DEIS, double counts the recharge. It does this by accounting for recharge from both precipitation and streamflow (which results from that precipitation). This differs from standard practice in Nevada NEPA reviews including the Ruby Hills, South Pipeline, Phoenix, and Betze-Post Mine proposals. Note that these are all mines where a groundwater model to estimate the impacts of dewatering was used. In these and others, the common usage of the Maxey-Eakin method (Maxey and Eakin, 1949) has been to assume that the method gives the total recharge but not the exact amount at the location the precipitation actually falls. Much of the precipitation and snowmelt runs off; the recharge occurs at the head of the alluvial fans onto which the ephemeral streams discharge.

16 – 3

A discussion of historic water level changes in the vicinity of Fish Springs Ranch due to irrigation pumping has been added to the *Water Resources* section of Chapter 4 in the Final EIS. In addition, hydrographs showing historic water levels in Fish Springs Ranch irrigation wells are presented in new Appendix F as part of this Final EIS.

16 – 4

A degree of uncertainty is associated with any modeling effort. Although there is some information regarding changes in water levels over time at Fish Springs Ranch, there is limited information regarding changes in aquifer stresses over time. Records were kept on changes in the total number of acre-feet pumped from Fish Springs Ranch wells, but not details on pumping schedules for individual wells. A transient calibration that considers changes in water levels over time due to changes in pumping rates from specific wells may have given more confidence in the model's predictive capabilities. Transient calibration based on data with the level of detail currently available would not have narrowed the degree of error associated with the model predictions presented in the EIS.

16 – 5

We do not believe that the model "double counts" recharge. The model does consider recharge from both direct infiltration of runoff and infiltrating stream flow. The Deep Percolation Model (DPM) calculates a mass balance for each cell in the model and removes runoff from the overall mass balance. Consequently, runoff from one cell is not passed on to adjacent downhill cells. As a result, the model treats runoff as if it is removed from the model domain, and the runoff term is not included in the estimate of recharge to groundwater from the DPM. Therefore, stream flow that infiltrates to groundwater needs to be added to the total amount of groundwater recharge. Handman et al. (1990) accounted for the runoff term by estimating stream flow and assumed that most of it infiltrates through the streambed.

Table 9 in Handman et al. (1990) compares recharge estimates derived from a combination of the DPM and stream runoff to those based on the Maxey-Eakin method for different portions of the basin and for the entire basin. Estimates for the flow model are 17,000 af/yr based on the DPM and stream flow estimates, and 11,000 af/yr from the Maxey-Eakin method. The difference between these two estimates is well within the range of error associated with such methods.

The DEIS relies on calculations completed by the U.S. Geological Survey:

> Using a deep percolation model, Handman *et al.* (1990) estimated mean annual recharge to eastern Honey Lake Valley from precipitation as ranging from no recharge in the valley floors to 3 in/yr in the Virginia Mountains. Overall recharge from precipitation in eastern Honey Lake Valley is about 4,200 af/yr (Handman *et al.* 1990). Another recharge estimation method used by Handman *et al.* (1990) is based on a percentage of precipitation: 25 percent where precipitation is >20 inches; 15 percent in the 15-20 in/yr precipitation zone; 7 percent where precipitation is 12 to 15 in/yr; 3 percent in the 8 to 12 in/yr zone; and 0 percent where precipitation is <8 in/yr. Results of this recharge estimate are similar to deep percolation method results for the study area. Infiltration of stream flow in eastern Honey Lake Valley occurs primarily in the alluvial fan areas where permeability of the sediment is moderate to high. In the eastern part of the valley, recharge from streams is estimated to be about 10,000 af/yr (Handman *et al.* 1990). (page 3-22)

Unfortunately, it appears that Handman et al (1990) made a simple mistake. The deep percolation model did not account for infiltration or other use of runoff from individual cells. The method completes a water balance calculation for cells across the basin of interest. Here, they divided the Honey Lake basin into 1 mile square cells. The method simulates rainfall/snowmelt onto and ET from the cell; excess precipitation either recharges if the soil is porous enough or runs off. Handman et al (1990) assume that runoff from each cell is runoff from the watershed. They assume the runoff reaches a drainage and then that it flows down the drainage and infiltrates; water in excess of that needed by streamside vegetation is recharge. They did not account for the runoff actually reaching the drainages; to do so it would have to flow across adjacent cells, possibly more than one, to reach the channels. If there is a deficit in the adjoining cells, this runon would replenish soil moisture and increase ET. This is common in models such as this where the runoff results from higher elevation cells and it contributes to ET on lower elevation cells. This is the process used by the Geological Survey to estimate recharge in other flow systems. Hevesi et al (2002) updated the deep percolation model estimated recharge in the Death Valley flow system; this model accounted for runon. By failing to use runon in the Honey Lake model, the GS essentially counted water as recharge that would have become ET. Once the runoff reaches the streams, they subtracted an appropriate amount for seepage and evapotranspiration of streamflow. Their description of the drainages also suggests there is a significant overestimate of runoff.

> In the north and east parts of the basin, vegetation in streams channels is sparse, irrigation diversions are uncommon, and, in dry to normal years, nearly all streamflow infiltrates. From Spencer Creek to Fort Sage Creek, annual streamflow is about 13,000 acre-ft. (table 6), hence annual recharge is about 13,000 acre-ft. (Handman et al, 1990, page 36)

16 - 6 This description belies the area. Streams with this much annual runoff would have streamside vegetation. The estimate of 13000 af/y of runoff which becomes recharge cannot be correct. The DEIS should reconsider and recalculate the recharge.

16 - 7 The groundwater model handled recharge through stream bottoms as well injection (page C-8); this is very unorthodox and is of concern because this method may control the head more than would applying it as a flux (with the recharge routine) or with the River boundary package which allows the groundwater level to fall below the bottom of the stream. In fact, using the recharge routine to apply a flux will allow the groundwater to assume any level because recharge can apply to the highest active layer. Using well injection could cause the higher layer to be active.

16 - 8 The model assumes that 2003 conditions occur at steady state. Because the pumping has not occurred at those rates (>4000 af/y) for that long, it is very unlikely that steady state conditions have been achieved. It is also very likely that most of the natural discharges, to Smoke Creek Desert, Pyramid Lake and to ET, still approximate their pristine conditions because there has been insufficient time for the pumpage to offset them. The basin is likely in a transient state, therefore, the water balance shown in Table C-1 for 2003 conditions is wrong. It is wrong because a steady state model forces the discharge to equal the recharge. In a transient situation, water would be released from storage to meet the extra pumpage.

The DEIS claims that a groundwater divide separates the eastern Honey Lake Valley from regions further west. A groundwater divide appears to be located about 3 miles west of the state line, resulting in no horizontal groundwater movement in this area (Lahontan GeoScience 2004; Webber 1996). Groundwater also flows south to the interior of

16 – 6
If we assume that streams run for only part of each year (use 100 days), 13,000 acre-feet in 100 days represents an average stream flow of 65 cubic feet per second (cfs). This is not excessive for a basin the size of the model domain in eastern Honey Lake Valley and given the amount of precipitation that falls in the surrounding mountains. Since most of the precipitation occurs in short-duration seasonal events, vegetation would not necessarily become established along these drainage channels. The 13,000 af/yr of stream flow recharge was estimated by Handman et al. (1990) using data in the northern and eastern portions of Honey Lake Valley, from Spencer Creek near Herlong to Fort Sage Creek near Flanigan.

16 – 7
MODFLOW's Well package cell is simply a constant flux boundary. The Recharge package is another type of constant flux boundary. Use of either cell type results in water input into the top of the cell at a constant rate. Use of the Well package cannot cause the upper layer to become active if the surrounding potentiometric surface will not support it. If the layer is dry surrounding a well package cell and the flux of water is not sufficient to wet the entire layer, the cell will not input water to the model. It should be noted that no dry cells appear in the model near the Well package cells used to simulate stream leakage.

16 – 8
See revised Table C-1 in the Final EIS, which includes transient water balances for 10 years and 100 years. Use of 2003 conditions for baseline is appropriate given the history of seasonal irrigation pumping at Fish Springs Ranch for many years.

eastern Honey Lake Valley from the northern mountains. (page 3-22). Without the data, this claim is dubious and is just too convenient for this water transfer proposal. The general model of flow in a closed valley is for recharge in the surrounding mountains and on alluvial fans with discharge from the playa and surrounding wetlands.

Dry Valley Groundwater Model

The Dry Valley model predictions are that the aquifer will eventually dry up and that all evapotranspiration and discharge to surface water in the valley will cease. Aside from the devastating impacts that this will have on the water resources of the valley, it indicates the model domain was incorrect. The following passage from Appendix C illustrates the point.

> For the proposed pumping of 3,000 af/yr, predicted groundwater drawdown eventually would be over 200 feet at the state line (**Figure 4-2**) and would result in **complete dewatering of** entire aquifer, except that portion within 5000 feet of the state line. **Model results suggest that** a pumping rate of 3,000 af/yr in western Dry Valley cannot be sustained indefinitely. **Drawdown at the pumping wells eventually would be about 1,500 feet**. Drawdown is calculated by subtracting groundwater surface elevations developed using the baseline model from elevations developed for pumping under the Proposed Action. According to Interflow Hydrology (2005), approximately 85 percent of reductions in water levels, subsurface outflow, and evapotranspiration are achieved after 100 years of pumping. (page C-15, emphases added)

16 - 9

The model used a general head boundary at the state line. The discussion suggested that the USGS predicted there was about 2200 af/y outflow to Long Valley (page 3-28). Considering that the baseline model conditions (Table C-3) show only 399 af/y flowing across the state line, which is close to the outflow point to Long Valley, the water balance in the model used for pre-development conditions may be completely wrong. The development scenario pumps three times the annual recharge in the model which indicates the model is very wrong. The reason that the aquifer does not dry near the state line is that the GHB boundary used to model flow across the state line both provides flow and helps to raise the head, thereby controlling the head in the aquifer. If the model had not been bounded by no flow boundaries, the impacts would have reached further into adjacent basins.

Instead of an outflow of 399 af/y, development causes an inflow from California equal to 1866 af/y; this is a change equal to 2265 af/y. There is no analysis of whether that water is actually available on the California side of the state line or the effects on Long Valley of removing that flow. The DEIS acknowledges that the water may not be available in Long Valley (page 4-26).

16 - 10

The BLM also fails to collect data where necessary. Because it is unknown what effect, if any, groundwater pumping in Dry Valley might have on groundwater in Warm Springs Valley (including Winnemucca Valley), no attempt at quantifying impacts is made. (page 4-29) NEPA requires the BLM to gather data where necessary and possible to fill in holes. Because the outflow from Dry Valley could be an important inflow to Warm Springs Valley, which as the BLM notes currently pumps at close to its perennial yield, the BLM should collect the necessary data.

Bedell Flats

The DEIS states that recharge varies from 1100 to 1500 af/y and that one of the consultants assumes there is approximately 1300 af/y inflow and outflow (page 3-31). The DEIS also indicates the State Engineer determined the perennial yield is 300 af/y and gave the project proponents only 144 af/y (Id.). The DEIS also indicates, everywhere it mentions this State Engineer ruling, that the proponents have appealed the decision. By stating this, the BLM appears to assume the ruling will be overturned and the proponent will get the water requested. State Engineer Ruling 5429 relies on findings by the US Geological Survey that perennial yield is 300 af/y. As noted in the ruling, it is longstanding State Engineer policy to use the USGS estimates. The court system will be loath to overturn the decision of the acknowledged expert in state government.

There is another way of looking at the perennial yield. Even if there is a higher recharge as estimated in the DEIS, there is little discharge within the basin. Downstream basins, specifically the Red Rock Valley, depend on this inflow. Most of the outflow calculated by the BLM is discharge of more than 1100 af/y to Red Rock Valley or unidentified locations. The State Engineer has a history of considering interbasin flow and if there is a history of or need for the use in the downstream basin, the State Engineer will not issue rights for the upstream basin. In other

16 – 9
The groundwater outflow value of 2,200 af/yr from Dry Valley cited in the *Water Resources* section of Chapter 3 in the EIS is from a 1967 report by Rush and Glancy from the Nevada Department of Conservation and Natural Resources. Since then, groundwater outflow values for Dry Valley have been revised. As stated in the same section of Chapter 3 in the EIS, the most recent USGS study of Dry Valley (Berger et al. 2004) determined groundwater discharge in the range of 700 to 1,000 af/yr, with up to 250 af/yr of this amount occurring as subsurface outflow to Long Valley. See revised Table C-3 in the Final EIS. This table does indicate that some groundwater would be drawn across the CA-NV state line.

16 – 10
See Response 15-44.

words, the downstream basins have previous call on any additional water developed in the upstream basin.

The BLM should not proceed with this EIS assuming that the proponent will be granted its water. In fact, there should be an analysis of whether it is economical for Interwest to go forward with its project. Would it develop its Bedell Flats water at all if it is limited to 142 af/y? Without the 500 af/y proposed from Bedell Flat, would Intermountain continue with its pipeline from Dry Valley? The project could become uneconomical.

16 - 11 The groundwater model for Bedell Flat appears to be extremely simple. It has just one layer which makes it a two-dimensional model. The DEIS describes the parameters as varying from unconfined to confined which is not possible in a one-layer model of a basin-fill phreatic aquifer. The DEIS states that the model uses the evapotranspiration package to simulate spring discharge (page C-16). 16 - 12 This is not correct; the ET package discharges water when the water table is below the groundwater surface (down to the extinction depth). The proper way to model a spring discharge is with the drain package which allows discharge only when the head exceeds the level of the spring; conductance values of the drain controls the flow as a function of the head. ET from vegetation near the spring would not be directly connected to the groundwater. Alternatively, the ET package is correct to use for wetland vegetation for which the roots tap groundwater.

16 - 13 The proposed pumpage does not dry the model cells like it does for Dry Valley, but it still cause substantial impacts. The outflow to surrounding valleys is substantially reduced. The BLM should consider the loss of this flow in the surrounding valleys.

Conclusion

The impacts of groundwater development in the Fish Springs Ranch, Dry Valley and Bedell Flats valleys will be devastating. The groundwater table will be substantially drawn down in each of the valleys. Springs and wetlands will be depleted or substantially dried in all of the valleys. The models used for these predictions are fraught with assumptions which minimize the predicted impacts. The biggest error, at least for Fish Springs Valley, is that recharge is grossly overestimated. In the other valleys, development will severely deplete the recharge to downstream valleys.

The impacts predicted herein appear to violate the BLM s mandate to avoid projects which will cause degradation of public lands. The BLM should deny these projects or severely limit the amount of water which may be exported from the valleys. The BLM s mandate is to manage public lands; it does not mean that the agency is taking over the administration of Nevada water law if it denies a project which will devastate public lands.

References

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16 – 11

The single layer MODFLOW model uses a Layer Type 3, which is a convertible confined/unconfined type. When the model produces potentiometric surface elevations in cells that are above the top elevation of a cell, the cell is treated as confined. When the potentiometric elevation is below the top of the cell, it is treated as unconfined. It should be noted that the current model uses ground surface elevations for the layer top elevations and the potentiometric surface elevation does not exceed the Layer top elevation; so the entire model domain is treated as unconfined by MODLFOW.

16 – 12

The area where ET package cells are used includes approximately 20 acres of wetlands that surround springs where plant roots are presumed to tap groundwater. Because ET from wetland plants would continue after the water table is lowered below the spring discharge point (down to extinction depth), use of MODFLOW's ET package is appropriate.

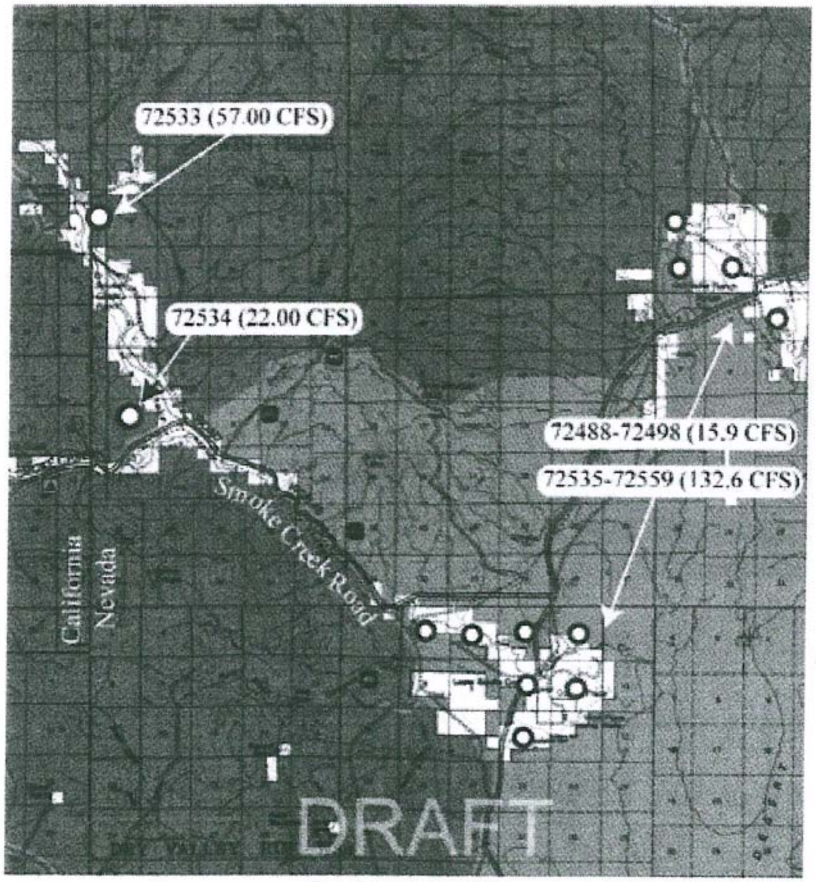
16 – 13

Comment noted. The *Water Resources* section in Chapter 4 of the EIS does include an assessment of potential impacts to groundwater flow at basins surrounding Bedell Flat (i.e., Red Rock Valley, Warm Springs Valley, and Antelope Valley). Also see the model summary in Appendix C of the EIS.

General Location of Pending Well Applications

Nevada Division of Water Resources Water Rights Data Base- April 2005

Granite Fox Power, LLC- Applicant



NO SCALE

Combined Total Shown on Map = 227.5 CFS

Map Prepared by Lassen County Department of Community Development 5-26-05

Letter 17

Comments of Bob Fulkerson,
on behalf of the Progressive Leadership Alliance of Nevada
North Valleys Rights of Way Projects Draft EIS
July 6, 2005

1. The DEIS reads like a "how to" manual in terms of pumping groundwater from the desert to feed rapacious growth in the North Valleys. A more critical view is needed, as the DEIS assumes the project is inevitable. The "alternatives" section is especially thin.

17 - 1

2. The DEIS provides less than lip service to the conservation alternative, which is not surprising given that the Regional Water Plan is silent on water conservation as well. The final EIS should analyze water conservation as an alternative. What is the current rate of water consumption in the North Valleys Planning Area? What could that demand be reduced to under both a moderate and a serious conservation plan?

17 - 2

3. The size of the pipelines belies the idea that this is a one-shot water grab. P. 2-7: "The Fish Springs Ranch water transmission pipeline has been designed to convey 8,000 af/yr. The pipeline would…vary from 22-30 inches in diameter…" A 30-inch pipeline can carry well above 8,000 acre feet of water. The BLM should insist the pipeline diameter be reduced substantially, to allow the pipeline to carry a maximum of 8,000 af/yr. What is the maximum acre feet of water that can be transported through a 30 inch pipeline? Is the oversized pipeline needed for the "next phase" of pumping? Is this just the first needle stick in an endlessly addictive and painful relationship with importing water from northern Washoe County?

17 - 3

4. What is the status of Washoe County's water rights along the California border, filed in the 1980"s under the "Silver State" Project? The oversized pipeline in the DEIS raises grave concerns that the next phase of this water grab will involve moving water from further north. The DEIS should clearly analyze potential future uses of the 30-inch pipeline considering the likelihood that Washoe County and private water interests will in the very near future propose additional water importation, using the pipeline under consideration in this DEIS.

5. A more comprehensive and thorough analysis of all projects that involve water along the California/Nevada border, such as the Sempra Power plant's application to pump 25,000 acre feet annually, is critical. Washoe County should be required to work with bordering eastern California counties to develop a multi-county water management commission to coordinate studies and uses of the bi-state acquifer system. A baseline water level in all bi state basins should be established, monitored, tested and evaluated before any large-scale pumping begins. The counties could establish a common groundwater monitoring ordinance for production wells, which include metering and automatic posting of data to websites for public viewing. . Adjacent local agricultural and other production wells should also be metered to protect against accusations that their over-pumping caused the water table to drop, not export pumping.

17 – 1

Decisions regarding production of groundwater, point of diversion, and beneficial use of water have been made by agencies with direct jurisdiction (e.g., Nevada State Engineer and Washoe County). BLM's authority is directed to decisions regarding the rights-of-way across public land being sought by the two proponents.

17 – 2

See revised text identifying design of pipeline system to convey a "maximum" of 8,000 af/yr (see Chapter 2 – *Fish Springs Ranch Proposed Action*). Conveying an amount of water that exceeds 8.000 af/yr would require modification of various components of the pipeline infrastructure which would involve review and authorization from local governmental entities and/or BLM.

17 – 3

Washoe County's water rights are beyond the scope of this document.

6. The Marshall scheme to pump 3,000 acre feet from DRY Valley is not going to happen. The water is not there. This idea was floated to make water planners feel good about meeting the 3,000 acre feet of water demand in Cold Springs anticipated when the area is built out. "Planners", developers and local governments have allowed home construction to occur in the North Valleys knowing full well the area was in water deficit.

17 - 4 The DEIS should analyze the impacts of what will occur to people already living there if the project is not completed.

17 – 4
See *No Action Alternative* section for each resource description in Chapter 4 of the EIS.

17 - 5 7. Who will "own" the water and pay for operation and maintenance? Washoe County or the Truckee Meadows Regional Water Authority? Who will be held accountable for secondary socioeconomic impacts and direct environmental impacts of the project that may have not been anticipated in the DEIS?

17 – 5
See Proposed Actions description in Chapter 2 of the EIS.

8. The population forecast tables are thin and incomplete. The "North Valleys Planning Area" (on Table 3-16) should be broken down into hydrographic basins, as is done by the Regional Water Planning Commission, which predicts much more startling growth rates (14.3% in Cold Springs through 2025) than the DEIS (7.8% average annual growth rate

17 - 6 throughout the North Valleys Planning Area). Is the "Annual Average Growth Rate 2000-223/2004" on Table 3-16 a trend that is expected to continue? How does this match with demand for water in the North valleys? The final EIS should project water demand based on anticipated growth rates in the North Valleys for at least the next 30 years.

17 – 6
Projection of water demand over the next 30 years is addressed in the Washoe County Regional Plan.

Thank you for your consideration of these views.

Bob Fulkerson
State Director
Progressive Leadership Alliance of Nevada
821 Riverside Drive
Reno, Nevada 89503
(775) 348-7557
bfulkerson@planevada.org

Letter 18

Lifestyle Homes TND, LLC. Box 7548 Reno Nevada 89510 775-750-5537

July 11, 2005

Mr. Terri Knutson
EIS Project Manager
Carson City Field Office
5665 Morgan Mill Road
Carson City NV 89701

Dear Ms. Knutson:

via fax and USPS
Re: North Valleys Rights-of-Way Projects

Lifestyle Homes TND, along with various partners, owns approximately 4,000 acres of developable land in Lemmon Valley and Cold Springs Valley. Our land suffers from the same lack of water that has hobbled other development in the area, so we have followed the EIS process with great interest. Our comments follow:

18 – 1 There are conflicting definitions of the "North Valleys Planning Area." On page 2-2 it is referred to as "Antelope Valley, Cold Springs Valley, Lemmon Valley, Red Rock and Bedell Flat hydrographic basins…" We suggest you maintain this definition.

18 – 2 On page 2-4 the "North Valleys Planning Area" is referred to (not clear) as Stead/Lemmon Valley areas." We suggest that you drop this definition and just refer to Stead/Lemmon Valley throughout the document when discussing the place of use.

18 – 3 Therefore, to address this concern, and to also address possible future actions by water purveyors, we suggest this language on 2-4:

PROPOSED ACTIONS

It is understood that The "Proposed Actions" are to install water pipelines and ancillary facilities on public and private land to convey groundwater from Honey Lake Valley, Dry Valley and Bedell Flat hydrographic basins for municipal use in the Stead / Lemmon Valley areas. However, it should be stated that the ultimate water purveyor, either TMWA, Washoe County and/or other purveyors, may identify additional beneficial uses for the groundwater, which may result in the groundwater being used directly or indirectly in areas other than Stead / Lemmon Valley. These potential beneficial uses would be the subject of an independent project or projects, which would require further local government regulatory review and approvals. Implementation of the Proposed Actions would result……

Sincerely,

RJLissner

Robert J. Lissner
Manager

18 – 1
See revised text in Chapter 2 for descriptions of geographic areas contained in this EIS.

18 – 2
See Response 18-1.

18 – 3
See Response 18-1.

Letter 19

Tim R Draper
P.O Box 521
Doyle, Calif 96109

To Terri Knudson 2005 JUL 19 AM 11:49

BUREAU OF LAND MGMT
CARSON CITY

My properly line is connected with Fish Springs Ranch.
I'am a ranch owner with well-100 ft.
I'am very concern is there going to be a water problem, ?. 10 years down the road, or sooner.
OR will I have to sue someone in federal court for 21 Million dollars Persona.
And I keep hearing alote of blasting somewhere hear in the Valley what is that all about ?.
As I read this newspaper article, virtually no impact to people in Calif.
19-1 What about the people that live right here in the area ?.
Now when you write back do not send a letter of horse shit like Brian Sandoval, Attorney General of Nev.
I'am very legal mined, I read alote of legal books.
(Do not snow ball me.)
I know Bob Thomson the foreman of Fish Springs Ranch. Mr. know it all. Sometime's I wonder.
19-2 When they have a public meeting I would like to be informed.
Please send the address of Jack Hanson would like to write or phone him in regards to this matter.
I would like to see a paved road out here. 14 miles of dirt road 30 miles of dirt road the other way.

19 – 1
See Direct, Indirect, and Cumulative Effects sections of Chapter 4 – *Water Resources.*

19 – 2
A public meeting on the Draft EIS was advertised in the Reno Gazette and local news media outlets. Future meetings will be similarly advertised.

Letter 20

NORTH VALLEY RIGHTS OF WAY PROJECT

Fish Springs Ranch proposes to contract and operate water supply and transmission project to meet present and future water needs of the North Valleys. The plan is for 8,000 acre feet of water to be pumped and piped 28 miles from Fish Springs to the one million gallon storage tank between Lemmon Valley and Antelope Valley in Washoe County Nevada. 8,000 acre feet of water per year (af/yr) figures out at 326,000 gallons of water per acre foot = 2,608,000,000 gallons of water from Fish Springs Ranch.

In Dry Valley, 3,500 ac/yr pumped equals out to 326,000 gallons per af x 3,500 ac/yr = 1,141,000,000 gallons of water per year.

The recharge according to hydrologists is from 2,670 af/yr to 111,500 af/yr Desert Research Institute estimated recharge from precipitation to be 1,400 to 48,000 af/yr. There is a flaw in the figures somewhere. When the area gets approximately 9 inches of normal precipitation a year, the area cannot take the loss of 3,749,000,000 gallons of water in one year. We live in a semi-arid environment and we get one normal year of precipitation in ten years. One normal winter does not become a drought breaker. This area is definitely not a rain forest climate.

20 - 1

The proposed new wells, well head transmission lines, water pipelines, pumping station and surge tanks just means now tearing up of an area that is sparse enough in flow and checking well heads and checking the pipelines without an all weather road, unless part of the pipeline follows the Tuscaroroa pipeline road. This way it will save tearing up more land for another road. Is this road going to be an all weather road? If so it will have to be patrolled as every dirt bike, RV, ATV will be using it as a take off for uncharted land to race around in.

According to the Draft EIS we pump about 70,000 af/yr of water x 326,000 gallons of water pulled fro the Long Valley aquifer each year.

Case in point, the using of so much water is showing up on the Honey Lake Plaza. Usually after a heavy winter of snow and late rains like the year (2005) there will be some water, at least a covering. For a few weeks there were puddles of water on the lake bed. It is completely dry now. So this should tell everybody something about the aquifer right here.

We are having more and more people move into the area which means more and more water to be pulled from the aquifer. Each time a mobile home is moved in or a house built out of the incorporated area it means another well to supple the home. Long Valley Creek usually runs a little bit into the lake until June. It has been dry from Highway 395 to the Honey Lake Playa for weeks.

20 – 1

The roads will not be paved; roads will be improved to the extent necessary to support construction activities. Once construction has been completed, roads that have been improved will be returned to preconstruction conditions.

That means as Lassen County grows we have less and less run off for Honey Lake. We are in a drought now. What happens if this drought made turns into another 1930's era? When there was no storm or so very little that people drove the Model T Fords over the dry lake bed chasing fish, rabbits and coyotes.

If there is a really wet year/years then Honey Lake has water in it. This past winter was almost normal but Honey Lake is dry the only water was standing in puddles on the playa.

The history part of the EIS states Honey Lake Valley in California experienced local droughts during the mid 1910's. Honey Lake was dry in 1919 filled up again in the 1920's. The last barge from Amadee was poled across the lake in 1926 before it went dry again (source: Rena Faye Sifford Baker, born in Susanville, California, March 1906, passed away February 1999, diary).

Honey Lake filled up again in 1937 after 10 years of having a skim of water or completely dry. In 1934 the US Army Air Force used the dry lake bed as a bombing range. My father took pictures of the bombing run.

Since Honey Lake is an alkali sink or playa it does not get very deep, maybe six feet at its deepest spot so in drought years the lake shrinks and disappears.

I can remember seeing the alkali just rising into the air from Honey Lake playa when I grew up in Johnstonville. I was about five years old. I can not remember Honey Lake ever being full enough to float a barge across it. It is dry again now. Each house built or manufactured home moved into the valley means that less water run off for Honey Lake.

The whole idea is flawed from the beginning in 1993 to twelve years later, it is still the same flawed thinking by Bud Pauchs and greedy Real Estate.

20 - 2

When it comes to the pipeline, page 3-17: How come this project is allowed to blast when Sierra Army Depot lost the permit to open pit detonation of outdated ammunition because of pollutants in the air? Now this water scheme has the right to blast. Blasting criteria would be held to limit peak particle sites and ground occupations to avoid damage. Just exactly how do the pipeline layers plan on limiting the amount of explosives? There has to be enough explosives to get the job done.

20 - 3

Stream crossings on wet lands, streams on riparian areas should all be accomplished on one days work. Requirement to make all streams, wetland, seeps and springs back to stabilized normalcy as soon as possible. The repair work and planting to be monitored for a minimum of five years.

20 - 4

Resource Monitoring: Fish Springs Ranch has proposed a monitoring program to document the changes in ground water levels. Exactly how many working wells does

20 – 2
Blasting will be conducted in accordance with applicable regulations.

20 – 3
Comment noted.

20 – 4
See proposed Fish Springs Ranch water resource monitoring program in Appendix D (*Recommended Water Resources Monitoring and Management Plan*) as part of this Final EIS.

Fish Springs have? There were originally seven and now there are about 15 including monitoring wells that ran be used to pump water and no record the amount of water pumped.

What happens in drought years? Why were wells drilled at Sand Pass and Astor Pass?

So the monitoring predications will cut 150 acre feet of ground water flow into Pyramid Lake. So Pyramid Lake has 2 percent less recharge of ground water a year.

No Alternative Actions

20 - 5 Chapter 1: Purpose of and need for action purpose of is a lot of money for the people selling the water and the greed of the Real Estate people to line their pockets. What is this water going to cost the consumer after all the new well heads, well pumping stations, electric sub-stations, water pipelines, etc. is installed?

Source: Turner Well Drilling, Susanville, California. To drill a domestic well now cost $33.00 a foot, six inch casing, sans, pump and tank. Most domestic wells now are one hundred twenty five feet or deeper (125 ft). $33.00 a foot x 125 feet = 4,125.00 for drilling only. By the time a pump and pressure tank is installed it is over five thousand dollars ($5,000) per domestic well, depending on how deep you have to drill.

Irrigation wells in the Honey Lake Valley area average about 700 feet. The charge for drilling irrigation wells is One hundred twenty five dollars ($125.00) a foot. $125.00 x 700 feet = eighty seven thousand five hundred dollars ($87,500.00) sans pump. That's a lot of money to have to pay out for re-drilling for a rancher who already has a working irrigation well or did have before the drawn down of the aquifer. Does Fish Springs; LLC and Intermountain Water Supply have a contingency plan for re-drilling both domestic and irrigation wells or do they plan on making this another Owens Valley? There is not a better example than the greed of Los Angeles and the deformation of the Owens Valley. (20 - 6)

Case in Point: National Geographic Magazine, January 1976, California's Parched Oasis, The Owens Valley, (Magazine included).

20 - 7 Chapter 1 (1-2): Two pipelines are not necessary the whole distance of 38 miles. Put both pipelines in the same right of way until the pipeline reaches the point of terminus and they have to divide. The best action is no pipeline and less growth for a greedy County that has out grown its water source and can't stop the greedy grasp of Real Estate being sold. Since Fish Springs Ranch, LLC has ground water rights to 14,108 acre feet of water per year that originated from irrigation permits issued in this Honey Lake Valley ground water basin. The State Engineer ruled an applications to change fish Springs Ranch water rights to municipal use in the North Valleys. Under the following

20 – 5
Retail water rates are approved by the Public Utilities Commission.

20 – 6
See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) as part of this Final EIS.

20 – 7
Comment noted.

applications. Total combined pumping shall be limited to 13,000 af/yr, of this 8,000 af/yr are included in the Fish Springs/Viler project.

20 - 8 Fish Springs Ranch proposed action: Does this mean all 13,000 af/yr goes to the North Valleys, or is there only 8,000 af/yr allowed to be piped to Lemmon Valley?

8,000 af/yr x 326,000 gallons per acre foot = 2,608,000,000 gallons of water per year, pumped out of the aquifer. The proposed actions is to provide 250 gallons of water per captio in the area. The 2,608,000,000 gallons of water divided by 250 will provide 10,432,000 people each year. Unless the hills are covered with houses there is a lot of
20 - 9 water not needed in the Lemmon Valley/Stead area. Or does this plan take in the housing development on US 395, and Red Rock Road, plus the Silver Knolls area?

Monitoring plan to be submitted to State Engineer. What is to keep the Truckee Meadows Regional Water Authority from asking for more and more water and the water being pumped from the monitoring wells, without permits?

The same question is asked of Intermountain Water Supply? What if more water is pumped for more houses than there is a permit for?

Page 1-8: Washoe County has imposed a policy that requires adequate water rights as an approval for and not for sub-dividing. The North Valleys planning commission and has plans for use of 150,000 acres of residential, commercial and industrial development. Specific plans have been made for cultural or scenic resources (archaeological resources). (Didn't think there was any in the area of the wells and proposed pipelines, historic places, and scenic areas) Until the money gets tight, then historic sites and scenic areas
20 - 10 will disappear through neglect. How would impact threshold criteria be established to identify ground water levels that will trigger protective enforcement action?

While the USGS says there is a barrier between Nevada and California, the barrier was conviently moved 4 miles west into California on the map. Like the whole of the Fort Sage Mountain drainage area is in the Fish Springs drainage map, almost to Long Valley Creek in California and almost half of Fort Sage mountains belongs to California.

Chapter 2: Descriptions of Prepared Action and Alternatives. The action causes 245 square miles, but excludes the city of Reno in the Stead area. What is to keep the City of Reno from tapping into the water in Lemmon Valley?

The Fish Spring claimed drainage area takes in the lower end of the Smoke Creek Desert. There is not enough water in Smoke Creek to supply Fish Springs, the Pyramid Lake Piaute Tribe, who claim ground water rights beneath the Smoke Creek Desert at the north end of the reservation.

This EIS is not as well put together as the 1993 EIS was. The Secretary of the Interior Bruce Babbitt stopped the pending action along with Senator Harry Reid serving on the

20 - 8
See the *Fish Springs Ranch Proposed Action* section in Chapter 2 of this Final EIS.

20 - 9
See Response 20-8.

20 - 10
See Response 20-6. Specific trigger points or thresholds have not been determined at this time; however, a committee will be established to review all suspect situations to determine if an effect is related to pumping by the Proponent(s), and if mitigation should be required as per the Nevada State Engineer (see Appendix D in this Final EIS).

Finance Committee.

20 - 11 The United States Geological Survey (USGS) is flawed on the amount of water available in the Fish Springs drainage area. There are not that much water available. What is the normal annual precipitation for the Fish Spring Ranch? Not the mountains the ranch complex? Do the USGS studies prove that all the water to be pumped is not just perched water (water that is prevented from percolating down into the normal aquifer by impermeable material beneath)? If it is perched water it can be pumped dry.

The Fish Springs complex gets its water from the Virginia Range, the Fort Sage Range and the Smoke Creek Desert. The Fort Sage Range has been marked off and the drainage boundary map as all of the drainage goes into the Fish Springs complex.

20 - 12 Since approximately one-half of the Fort Sage Mountains facing west and south lays in California. How is the water going to drain into the Fish Spring aquifer? There is suppose to be a barrier between Honey Lake valley and East Honey Lake Valley so all of the Fort Sage Mountains should not be in the drainage boundaries for Fish Springs.

20 - 13 Warm Springs fault, an earthquake fault that runs through the area is not very active and it is being assumed that the old cracks and are full of water. Is the USGS sure these fault cracks are full of water and the fault is not creeping to ward the wells to either shut off the water supply or to collapse the wells?

20 - 14 The USGS should review the area again with new personnel and detect the faulty findings. Some of these geological studies are from the 1990-1993 study. The study was flawed then and is flawed now.

Page 2: We don't exactly live in a rain forest climate here and the amount of water being pulled out of the ground with this project is mind boggling. We don't receive a normal amount of precipitation except about one year in ten. This last winter was nearly normal in precipitation, the first in 8 years which is about normal for this area. It still has not broken the drought.

If California's Department of Water bulletin 118 (2004), Lassen County is correct the area draws approximately 70,000 af/yr for well user that equals out to 2,282,000,000 gallons. Lassen County does not have any water to spare for Nevada's urban sprawl of ticky-tacky houses, bunched together in a little basin with a playa in the center. If there is a playa there why hasn't the Truckee Meadows Water Authority drilled in the Playa at Cold Springs?

The water has to go through a treatment plant anyway and be treated with hypochlarite solution (a salt as orester of hypochlorous) before people can use it. (Hypochlorous acid occurring only in solution is used as a usage and instable deoradrant, bleach and oxidizer).

20 – 11
The *Water Resources* section in Chapter 3 of the Final EIS describes hydrogeologic conditions in eastern Honey Lake Valley, Dry Valley, and Bedell Flat. The USGS recharge data for Honey Lake Valley contained in Handman et al. (1990) are based on measurements of precipitation and stream flow throughout the basin. Irrigation wells located at Fish Springs Ranch show that pumped water is not from perched aquifers, but is from the basin-wide valley-fill sediments and from bedrock surrounding the valley.

20 – 12
Comment noted.

20 – 13
It is not known whether the Warm Springs fault is a conduit or barrier to groundwater flow; however, faults are not known to creep and shut-off or collapse water supply to wells.

20 – 14
Comment noted. Data collected by the USGS from 1990-93 are valid and used in the current EIS analysis. Groundwater flow models have been updated using more recent water resources information from the basins. The USGS has provided comments on the current groundwater modeling completed for each of the valleys; Bedell Flat, Dry Valley, and east Honey Lake Valley.

Road access to Fish Springs Ranch, LLC from US 395/Laver Crossing can become impassable in both late summer and winter time. The road around Turtle Mountain and on the east slope can get feet deep in sand if the area is not kept graded and grounded. This is an unimproved road the biggest share of the road lays in Lassen County and I am assuming the Fish Springs Ranch, LLC will want to expect Lassen County to maintain the road all year long.

20 - 15 How long will this water transportation system supply the North Valleys? If the Truckee River Water Authority doesn't have enough water now for their potential customers, what will stop the water companies from using water from the monitoring wells to supply more growth? The simple solution is if the water isn't available then you don't build.

Smoke Creek Desert out flow 13,000 af/yr into Pyramid Lake. So if Fish Springs draws 5,700 af/yr that is 4 percent of the recharge , 6 percent total of water lost to Pyramid Lake.

Any time someone is Washoe County has a water scheme, Pyramid Lake gets it in the neck.

Point of issue: The Newlands Project:

If Granite/Fax builds their proposed plant at Gerlach they will also pull out of the Smoke Creek Desert and from the local aquifer. There is not enough recharge from Smoke Creek Desert to supply both companies.

20 - 16 (More on Fish Springs) According to Mr. Pattlock from Fish Springs Ranch they are already pumping nearly 8,000 af/yr for irrigation purposes. The EIS states it is 42,000. Who is right? How long will the water serve the North Valleys. It is being projected a 100 year plan. If there is not enough water already available, what is to stop the water companies from using water from the monitoring wells and not recording it.

The simple solution is if the water is not available you simply stop building. It is not a complicated deduction if you don't have water available you don't steal it from another state to further you own economic growth.

20 - 17 In 2004 Lahanton Geographic Service modified the 1990 model to 5 miles to the east because of a ground water divide identified in that area. The Washoe County Utility District completed 26 wells in the vicinity of Fish Springs Ranch in 1989-1990. First these were wells for irrigation then there was 8 more then monitoring wells. Exactly how many wells has been drilled in the Fish Spring Ranch area?

No Alternative Action

On pumping of water for Warm Spring Valley. Affected environment Bidell Flat and Dry

20 – 15
The term of the requested rights-of-way is 30 years. If Proponents want to pump more water than is requested and stated in the EIS, assuming the amount of additional water has been approved by the Nevada State Engineer, then local governmental entities and/or BLM would need to review and approve these projects where modification to the water pumping and transmission systems is required.

20 – 16
The volume of groundwater being seasonally pumped to support irrigation at Fish Springs Ranch is approximately 4,200 af/yr. See the *Proposed Actions* section of Chapter 2 in the EIS.

20 – 17
Wells drilled in the Fish Springs Ranch area are described in the *Water Resources* section of Chapter 3 in the EIS. The exact number of wells completed in eastern Honey Lake Valley is difficult to determine because of the many groundwater studies that have been conducted in the area for several decades.

Valley. Two methods of estimating recharge to Dry Valley were used by Stanter Consulting and Cordillion Hydrology (2000) Resulle indicate ground water recharge rates of 2,670 and 11,150 af/yr. The Desert Research Institute (2000) estimated ground water recharge of 1,400 to 48,000 af/yr. There is something with these figures. Nineteen (19) wells in the Valley inexentorial, eight (8) of which were installed by the USGS in 2002. The eight maintaining wells were installed in five mean the Nevada/California line. Intermountain Water Supply Project plan on using diesel powered engines to pump water from two wells in Dry Valley and one well in Bidell Flats which would supply the Lemmon Valley with 3,500 af/yr. Since this is a three stage operation the area would be torn up and left open to erosion from wind and storm.

20 - 18 Campbell/Raintree Spring would eventually decline by 20 feet due to pumping 500 af/yr. Any free flowing springs in the Redrock and Warm Springs Valley could experience flow reduction is they are connected to the deep aquifer. Don't North Valley know if the springs and surpan connected to the deep aquifer.

20 - 19 Exactly how do you simulate ground water pumping from wells that are not yet drilled? There is no depth gage or information to build the assumption on. If there is a bedding of comported sand the pipeline can shift. Sand, even compacted sand, can and will shift.

There is sumac activity and there is fault running through Dry Valley and Bidell Flats. A hard 7.0 pr better quake could wreck havoc with pipelines and will and water sources. A lot of people cold be out of water because of a hard stake. They do occur in this area, not frequently and not hard as a rule, but they happen.

There was a quake in 1979 in Honey Lake (North) that shook up everything. Since I lined right off of a supposed dormant fault I was surprised to learn a week later I had exactly one-half the flow of water in my domestic well. The well went from 10 feet below the top of the well to 32.5 feet below the top of the well. It went from 10 gallons a minute to less than 4 gallons a minute. I had to have a new well drilled because of an earthquake.

20 - 20 What happens if worse case scenario happens to all these producing wells? Worse yet what happens to the humans depending upon the water being supplied by pipeline? If fault creep can bend and destroy a well, then imagine what a hard quake can do.

Affected Environment: The North Valleys Rights-of-Way Projects consists of one pipeline from Fish Springs Ranch extending 38 miles to a terminal storage tank between Lemmon and Antelope Valley. Intermountain water company from wells in Dry Valley and one in Bidell Flats on 24 mile pipeline to a near Reno-Stead air pact fond Lemmon Valley.

Fish Springs Right-of-Way lies adjacent to the Tuscarora gas line Right-of-Way. Intermountain water supply pipeline parallels the Fish Spring pipeline before devercing south into Lemmon Valley.

Environment Concerns are: Air quality - Diesel smoke from equipment to build the

20 – 18
Springs located within the predicted groundwater drawdown areas for each well array have the potential to be affected by groundwater production. See Response 15-18. A monitoring and management plan would be implemented to address uncertainties about the effects of pumping (see Appendix D in Final EIS).

20 – 19
Groundwater models allow the modeler to input aquifer characteristics into the model and to withdraw water through specified points within in the modeled area. The model simulates the potential effect that a real well could have on the aquifer. The model is "calibrated" to existing groundwater conditions as measured from existing wells in the study area. Pipeline design includes specific bedding for the pipeline such that the pipe would be protected and small shifts would not affect the integrity of the pipe.

20 – 20
Comment noted. Failure of the water supply system could result in an interruption of service. Depending on the reasons for and severity of the failure, the length of time to repair and restore service is not predictable.

pipelines both of them blowing dust and sand from the disturbed soil until nature plants take over again (anywhere from thee to five years). Threatened endangered candidate and special status. The sage grouse are already an the down slope and if the water draw down is enough to dry up seeps. And springs the sage grouse are opt to disappear. It will take years for the grass and pastures to come back and the birds will have to find other habitat to live in or the lands are defined as areas that are inundated or saturated by surface water or ground water at frequency and duration sufficient to support a pipeline of vegetation typically adapted for life in saturated soil conditions.

These wetlands must be preserved for the wildlife both migratory and permanent in the area. Along with enough brush and flora to feed all the various species, large mammals, include mule deer, prong horn antelope, coyote, mountain lions, bob cats, badgers and wild horses. Small animals are mostly of the rodent family and the rabbit family of mammals. The raptors include hawks, eagles, owls and falcons. Upland game birds include sage grouse, California quail, chuckars and mourning doves. The Carson wandering shippers and endangered butterfly also has habitat in the area. Besides all the forgoing animals and rodents, the reptiles and amphibians have around the springs and sups. The draw down of the water table is going to affect all these springs and sups because the shallow water were he drawn deeper in the aquifer. The wild life, the sage brush and flora needs to be protected from the draw down.

All cultural, artifacts, special Native American Lands, seeps, wetlands and streams, fax, wildlife should be protected against this impact action plan .

Summary and Questions that need to be Answered

20 - 21 In reading and dissecting the EIS, I find the USGS modeling of the wells is erroneous in many cases.

20 - 22 What makes the USGS think of the aquifer in east Honey Lake Valley is drawn down it won't draw water from the aquifer from the northern aquifer?

20 - 23 What happens when our aquifer is drawn down and we haven't any water in south Lassen County?

Is Fish Springs Ranch, LLC and Intermountain water supply ready to drill new wells for the residents and farmers from this area? It is pretty hard to get water from a dry aquifer.

20 – 21
See Response 20-14.

20 – 22
Predicted effects from implementation of the Fish Springs Ranch proposed Project would lower the water table in Lassen County 1 foot or less near the state line (see *Water Resources* section in Chapter 4 of the EIS).

20 – 23
Requiring replacement of impacted water supplies and sources of water are the responsibility of the Nevada State Engineer. See Appendix D (*Recommended Water Resources Monitoring and Management Plan*) which includes monitoring measures for groundwater quantity and quality, and selected areas of riparian habitat.

20 - 24 How long will this importation project serve the North Valleys?

20 - 25 Will the Fish Springs Ranch and Intermountain water supply be able to use water from the monitoring wells to supply more water?

This is a big bucks scheme that is going to line the pockets of a few on the backs of consumers. The cost of one af of water is going to be astronomical per capita.

20 - 26 How can the USGS make a modeling af of a well that hasn't been drilled yet? California does not have a law preventing export of water from the state. They do have water districts that can say yea or nay to this project. It is not fair for the big city to walk all over a little county just to boast their ego. There should be no alternative action to this proposal. The answer should be no.

20 - 27 The USGS finds are flawed. Everything is figured on a 100 year basis. There is not enough water in the aquifer to provide 8,000 af/yr for 100 years.

20 - 28 The best action for this whole idea is no alternative action on the whole plan.

20 - 29 Fish Springs Ranch, LLC, no action.

20 - 30 No alternative action on the Dry Valley, Bedell Flats proposal either. The USGS needs to go back and ride this assumptions and configurations.

20 - 31 Old data used from 1989-1993 is outdated water views to change with fault creep and other earth movements. Anew survey needs to be run. The pipelines are gong to tear up to much desert and open it up to people who will destroy the flora and fauna with their off road vehicles .

20 - 32 I am asking for NO ALAERNATIVE ACTION on all parts of the EIS.

Laura Blickenstaff
Box 742
Herlong, Calif 96113

20 – 24
The rights-of-way applications to BLM indicate a 30-year life.

20 – 25
The Fish Springs Ranch Proposed Action indicates that water production would come from new wells installed for the purpose of pumping.

20 – 26
See Response 20-19.

20 – 27
Comment noted. Steady-state conditions are also presented in the model results. See *Water Resources* section in Chapter 4 of the Final EIS.

20 – 28
Comment noted.

20 – 29
Comment noted.

20 – 30
Comment noted. The No Action Alternative is described for each resource in Chapter 4 of the EIS. See also Response 20-14.

20 – 31
Comment noted.

20 – 32
Comment noted. See also Response 20-30.

Letter 21

Terry Grotbo

From: Terri_Knutson@nv.blm.gov
Sent: Monday, July 18, 2005 10:13 AM
To: rfdelong@enviroincus.com; dpattalock@vidlerwater.com; BIGBOFF@aol.com; Terry Grotbo
Cc: Ken_Nelson@nv.blm.gov
Subject: Fw: Water projects comment

----- Forwarded by Terri Knutson/CCFO/NV/BLM/DOI on 07/18/2005 08:27 AM -----

"grover greeves" <grovergreeves@hotmail.com>
07/17/2005 03:48 PM

To nvalleyswater_eis@blm.gov
cc
Subject Water projects comment

8408 Woodmore Dr.

Orangevale, Ca 95662

TG ①

21 - 1 I am totally against the pumping of water from the Fish Springs Ranch area and the Dry Valley area. The anticipated ground water would be unsustainable, and it's removal would undoubtedly affect the habitat of the Carson Wandering Skipper and other desert dwelling plants and wildlife.
This boondoggle, which would surely entail some taxpayer's funds is proposed solely for some sleazy, greed-head developers and would only further impact desert lands north of Reno.

~ Grover

21 – 1
Comment Noted.

Letter 22

"Susan" <adink@gbis .com>
06/29/2005 10:11 AM

To <nvalleyswater_eis@blm.gov>
cc
bcc
Subject Fish Springs Water Project

Terri Knutson

U.S. Department of the Interior

Bureau of Land Management

Carson City Field Office

Fish Springs Water Project

Dear Terri,

It has come to my attention that the Fish Springs Water Project will be using the road in front of our property located at Dixie and Benner Drive just below the Tuscarora Gas Line as the access road for construction on the water pipe line. We are planning the construction of our new home at this location, to begin in the spring of 2006. We have some concerns about the water project that will effect us. I am hoping you will be able to address our concerns and respond to them as soon as possible.

(1). The construction access to the site.

22 – 1 Our concerns are the dust and wear on the roads from equipment and workers driving on the roads during construction or for possible inspections to the pipeline in the future.

(2). Noise from the pipeline.

22 - 2 We are concerned weather or not there will be any detectable noise generated from the pipeline after the project is complete.

(3). Location of the water storage tanks.

22 - 3 We understand that the land were the storage tanks are to be located are in the Bedell Flat valley not too far from our property. We would like to know what kind of visual distraction to the landscape this will create. Will there be any vegetation in the form of trees to camouflage the tanks? We understand that we have little or no control over the site were the tanks will be located, but it is important for us to know what to expect our view to be. We are planning to build our home with the valley as our main focal point and this could have a big impact on our quality of life.

22 – 1
Fugitive dust would be controlled during construction of the pipeline system. Road improvements would be made where necessary to support the construction operation.

22 – 2
Noise levels from the operating pipeline are anticipated to be minimal.

22 – 3
The location and color of the proposed tank would conform to the VRM classification for public land (see *Visual Resources* in Chapter 3 – Affected Environment and Chapter 4 – Consequences of the Proposed Actions and Alternatives).

(4). Time frame for the construction.

22 - 4 We are hopeful you can tell us approximately how long the construction will take in our area and how long will the construction workers be using the access road in front of our property?

We would appriciat if you can address our concerns and respond as soon as possible. We purchased this property to build our Dream Home and we are worried as to how this project will impact our lives.

Sincerely

Robert & Susan Reaney

10230 Shenandoah Dr.

Reno, NV 89506

775-972-1946

e-mail: adink@gbis.com

22 – 4
See Proposed Actions descriptions in Chapter 2.

Letter 23

Bureau of Land Management
Carson City Field Office

North Valleys Rights-of-Way Projects Draft EIS

Comment(s)

Name: John C Fuller Date: Jun 7 2005

Organization or Affiliation, if applicable: Myself

Mailing Address: 3620 Raygen CT

City/State/Zip: RENO NV 89509

AFTER READING the Complete EIS Report, (THANKS for the CD) I wish to comment

23 - 1 IN FAVOR of Both Projects. THIS EIS is the most comprehensive study I HAVE READ. I ALSO WISH TO THANK THE STAKE-Holders to Be present to ANSWER the Questions I HAD. THE IMPORTATION of THE WATER will enhance our AREA Growth Problems regarding water. AFFORDABLE HOUSING IS NON-Existant Median Price of HOMES currently $312,000, THE Growth will be highly PLANNED, Sewer TRANSPORTATION, WATER, Subdivisions, etc

(Please use additional sheets, if necessary)

This form should be sent to the Bureau of Land Management, Carson City Field Office by July 20, 2005.

Bureau of Land Management
Carson City Field office
Attn: Terri Knutson
5665 Morgan Mill Road
Carson City, NV 89701
Fax: (775) 885-6147
E-mail: nvalleyswater_eis@blm.gov

23 – 1
Comment Noted.

Bureau of Land Management
Carson City Field Office

PAGE 2

North Valleys Rights-of-Way Projects Draft EIS

Comment(s)

Name: John Fuller   Date: Jun 7, 2005

Organization or Affiliation, if applicable: Myself

Mailing Address:

City/State/Zip:

For the FOLKS WHO Live in the RURAL AREAS the AREAS ARE GOING TO Be Kept Rural. Growth (PLANNED) will be in the AREAS with TRANSPORTATION controlled Regionally, Sewer TMWR Water - County & TMWA. THE EXISTING Water Line to STEAD was Built IN 1942, THERE IS NO ~~WATER~~ MONEY To Put New Line in. THIS Water will insure as A Backup to that Line. Please Pass and Issue Permit ASAP.

Sincerely Yours John C Fuller

(Please use additional sheets, if necessary)

This form should be sent to the Bureau of Land Management, Carson City Field Office by July 20, 2005.

Bureau of Land Management
Carson City Field office
Attn: Terri Knutson
5665 Morgan Mill Road
Carson City, NV 89701
Fax: (775) 885-6147
E-mail: nvalleyswater_eis@blm.gov

Letter 24

jean public
<jeanpublic@yahoo .com>
06/04/2005 10:56 AM

To nvalleyswater_eis@blm.gov
cc rodney.frelinghuysen@mail.house.gov
bcc
Subject public comment on federal register of 5/23/05 vol 70 n 98 pg 29534

usdoi blm nv 030 5101 er f340
n76800
n76897
noa north valleys right of way draft eis

first of all, blm, the agency in charge here, is so awfulthat it takes wild horses, the symbol of our land according to congress, and takes them off their birth homes and sends them to slaughterhouses. this agency is bereft and should be cut off from funds since it does such despicable work.

secondly i oppose and object to national land, which taxpayers have paid to support as preserved for eons, being usurped by a locality. if the locality wants the land, they should pay for it if the american people want to sell it.i do not appreciate u.s. taxpayers being ripped off this way. Locals seem to forget that the land is nationally owned and not just theirs because it is next door and open space.

if over my objections this change is made, a stipulation must be inserted in any deed that this land can never be assumed by any foreign company or any foreign government. this land is american land, never to be bought by any foreign interest, so that water is not american.

24 - 1 there is a coming scarcity of water and we need to protect ourselves now.i am sure that blm would just let our water be given away like they let our horses go to hell.

b. sachau
15 elm st
florham park nj 07932

24 – 1
Comment Noted.

Letter 25

7-5-05

DEAR TERRI,

This is in REGARDS TO the WATER issues BEING DISCUSSED IN the DRY VALLEY, FISH SPRINGS AND GERLACH AREAS.

MY FAMILY AND I OWN AND OPERATE the HONEY RANCH ALONG Highway 395 BETWEEN JANESVILLE AND MILFORD CA. WE ARE VERY CONCERNED AND WORRIED ABOUT ANY PROPOSAL TO EXPORT ANY WATER FROM the ABOVE MENTIONED AREAS.

HONEY LAKE, which is Right BEHIND OUR PLACE is DRY FOR the SECOND YEAR IN A ROW.

The SPRING ON OUR PROPERTY has gone DRY FOR only the SECOND TIME SINCE WE'VE LIVED HERE - 20 YRS.

25 - 1 WE NEED EVERY DROP OF WATER WE CAN get to ENSURE the moisture will BE in the FLORAL SOURCES to PRODUCE NECTAR FOR HONEY PRODUCTION.

PLEASE DON'T LET WATER EXPORTATION DESTROY OUR BEAUTIFUL COUNTRY

SINCERELY - Kelley Holmes
KELLEY HOLMES
458-060 Hwy 395
MILFORD CA 96121

25 – 1
Comment Noted.

Letter 26

TUSCARORA

GAS TRANSMISSION COMPANY
1140 Financial Blvd., Suite 900 • Reno, NV 89502
P. O. Box 30057 • Reno, NV 89520-3057
(775) 834-4292 • Fax: (775) 834-3886

8/2/05

2005 AUG -2 AM 10:40

RECEIVED
BUREAU OF LAND MGMT
CARSON CITY
FIELD OFFICE

July 29, 2005

United States Department of the Interior
Bureau of Land Management
Terri Knutson, EIS Project Manager
5665 Morgan Mill Road
Carson City, Nevada 89701

Re: **North Valleys Rights-of Way Projects Draft EIS**

Dear Terri Knutson,

Tuscarora Gas Transmission Company's ("Tuscarora") wishes to thank the BLM for the opportunity to comment on the Draft Environmental Impact Statement ("Draft EIS") referenced above. We appreciate the effort that provided the analysis of both projects into one document.

26 - 1 Tuscarora's comments are primarily focused on issues relating to our existing Right-of-Way N-57450 ("ROW") for a Natural Gas Pipeline. We want to emphasis the existing pipeline delivers approximately 50% of the natural gas into the Truckee Meadows delivering to large customers for industrial, commercial and residential energy purposes. The existing natural gas transmission pipeline and related facilities can operate at pressures of 1000 pounds per inch in the vicinity of the newly proposed waterline projects. Foremost, we want to emphasis safety to the public and all personnel working on or near our existing Right-of-Way, and to ensure integrity to our pipeline facilities as directed by regulations.

26 – 1
Comment Noted.

While reading this Draft EIS we notice language that says certain segments of the proposed pipelines would be located within, or adjacent to, the Tuscarora Gas Pipeline right-of-way. Other than crossings at needed locations and sharing of the most outward 10 feet of the existing ROW for temporary construction work-space, Tuscarora has not discussed or considered the other projects facilities within the existing easement. Staging sites should not be located on the Tuscarora ROW. Language within the document should more clearly describe the intent of using the 10-feet as previously discussed with Tuscarora.

We concur that in order to minimize direct soil and vegetation resource impacts that it may be desirable to abut the Rights-of-Ways to the extent possible. It would be helpful it the document could provide a "Typical" cross-section of the proposed Rights-of-Ways in relationship to the Tuscarora Gas Transmission ROW.

26 - 2 We must visit all proposed crossing of our facilities. Engineering representative from all parties need to meet to discuss construction and operational concerns prior to construction. The project proponent will need to confirm the exact depth of our existing facilities to minimize their in-field design changes. Tuscarora recommends an 18-inch separation between facilities. The waterlines need to be staked in the field and identified on reasonable sized scaled maps. We recommend a detailed drawing for the crossings be prepared prior to construction in order to avoid impacts to our existing 20" pipeline that is buried 30-inches or deeper within our ROW.

26 – 2
Comment Noted.

The project proponents must coordinate the excavations (which will be deep at the crossing points) so that Tuscarora personnel are on site during the excavation. During construction and the crossing of these facilities we will monitor the pipeline on site. In those areas where the proponents propose to utilize the outer 10-feet of our ROW for temporary construction purposes, the limit of that shared ROW should be staked and roped to avoid encroaching further onto the pipeline ROW. Also, this area of temporary construction along the existing ROW should avoid the use or storage of heavy equipment and/or materials. Crossings of the pipeline should be perpendicular to one another. Grading of surface material from over the pipeline cannot occur except at those soon to be identified crossing locations. In some instances, depending on site specific field conditions, we may need to have material brought in to ramp over our pipeline to minimize impacts caused by heavy equipment and materials.

26 - 3 Tuscarora has invested substantial amounts of time and money in reestablishing the ROW and has worked closely with the Carson District BLM Office in order to minimize the impacts to vegetation and soil resources. Tuscarora would further recommend that the existing populations of Noxious Weeds identified in the Draft EIS be treated or pulled in those identified populations prior to construction. Also, one of the Reclamation goals in the document is to stabilize disturbed areas and protect adjacent undisturbed areas from unnecessary or undue degradation. This could be expanded to also include adjacent previously disturbed areas (our existing ROW).

26 – 3
Comment Noted.

26 - 4 On page 2-30 we noticed language describing the existing road associated with Tuscarora? Tuscarora to the greatest extent possible utilized existing roads and trails.

Also, Tuscarora has a substantial investment in its existing cathodic protection system. The reference corrosion control methods proposed for the new pipelines must take into account our system and mitigate all impacts to our system. Our system has been designed to ensure compliance with federal regulations and codes. This requires absolute prior communication and planning between the parties.

26 – 4
Comment Noted.

26 - 5 The Draft EIS points out more than once that blasting may be required or tractor-mounted rippers would be needed to get through some of the hard rock areas. Tuscarora needs to participate in discussions outlining criteria established to minimize impacts caused by the blasting activity. A written "blasting plan" should be provided to us for review and we need to approve the techniques and methods proposed to minimize impacts associated with blasting near our pipeline.

26 – 5
Comment Noted.

We look forward to working with the BLM Carson City Office and providing the information and resources necessary to facilitate your decision making process.

Please feel free to contact me at 775 834-4667 if you have any questions regarding these comments or need any additional information.

Sincerely,

Terry Wolverton

Terry Wolverton
Manager, Right-of-Way and Environmental Affairs

CC:	Bryce Lord	Tuscarora Gas Transmission Company
	Paul Beck	Tuscarora Gas Transmission Company

APPENDIX A

Spring Inventory

TABLE A-1. SPRING/SEEP/WELL SURVEY IN NORTH VALLEYS PROJECTS AREA, JULY 2004

Map and Site No.	1990 JBR Field No.	Site Name	GPS Coordinates (UTM)	Water Feature						Habitat(s)						Estimated Size (acres)				Potential Suitable TES Butterfly Habitat			
				Spring	Seep	Well-Flowing	Well-Pumped or Dry	Re-emergence	Off-Site Source	Aquatic-Flowing	Aquatic-Pond	Herb. Wetland	Shrub Wetland	Herb. Upland	Shrub/Tree Upland	<0.1	0.1-1.0	>1.0-10.0	>10.0	None	Low	Moderate	High
DRY VALLEY																							
DVC- 81	WW-35	Dry Valley Pools Spring	10S 0755812 4427844	X				X		X	X	X					X						X
DVC- 82	WW-34	Lower Dry Valley Re-emergence	10S 0755672 4427636					X		X	X	X						X					X
DVC- 85	WW-32	Hubbard Spring No. 1 (actually No. 2)	11S 0248985 4424921	X						X		X			X		X					X	
DVC- 86	WW-33	Duckweed Spring	11S 0248339 4426301	X						X		X					X				X		
DVC- 87	WW-?	Unnamed	11S 0248698 4426022	X								X				X					X		
DVC- 88	WW-18	Hubbard Spring No. 2 (actually No. 1)	11S 0248445 4425234	X						X		X						X					X
DVC- 89	WW-88	Contact Seep	11S 0248187 4425127		X							X				X					X		
DVC- 90	WW-17	Wild Rose Spring	11S 0248094 4424954	X						X		X					X			X			
DVC- 91	WW-82	Leaking Bench Spring	11S 0246973 4425224	X						X		X			X		X			X			
DVC- 96	WW-79	Rusty Hinge Spring	11S 0244825 4425655	X						X		X				X						X	
BEDELL FLAT																							
BF- 133	WW-29	Carl Spring	11S 0255234 4423071	X									X			X				X			
BF- 136	WW-23a	Upper Canyon Spring No. 3	11S 0255889 4422190	X								X				X					X		
BF- 137	WW-23b	Lower Canyon Spring No. 3	11S 0255890 4422130	X								X				X					X		
BF- 138	WW-24	Undeveloped Canyon Spring	11S 0254958 4421899	X						X		X	X			X					X		
BF- 139	WW-25	Canyon Spring No. 2	11S 0254732 4421911	X						X		X				X					X		
BF- 140	WW-26	Canyon Spring No. 1	11S 0253775 4422555	X								X	X			X					X		
BF- 141	WW-27	Undeveloped Canyon Spring	11S 0253600 4422716					X				X				X					X		
BF- 142	WW-31	Raintree (Campbell Ranch) Spring	11S 0252016 4420727	X						X	X	X						X					X
BF- 143	WW-5	Bedell Seep	11S 0256118 4420234		X					X		X	X		X	X				X			
BF- 146	WW-1	Dogskins Willow Spring	11S 0258679 4420007	X								X			X	X				X			
BF- 147	WW-4	Bedell Spring	11S 0256239 4419802	X								X				X				X			
BF- 207	-	Bedell Flat Well	11S 0256899 4413783				X			X	X			X	X	X					X		
BF- 208	-	Unnamed Bedell Flat Troughs/Ponds	11S 0254519 4413116						X	X	X	X		X	X	X						X	
BF- 209	-	Bird Spring	11S 0251778 4409238	X								X					X						X
BF- 210	-	Juniper Spring	11S 0251834 4409090	X								X			X	X					X		

TABLE A-1. SPRING/SEEP/WELL SURVEY IN NORTH VALLEYS PROJECTS AREA, JULY 2004

Map and Site No.	1990 JBR Field No.	Site Name	GPS Coordinates (UTM)	Water Feature						Habitat(s)						Estimated Size (acres)				Potential Suitable TES Butterfly Habitat			
				Spring	Seep	Well-Flowing	Well-Pumped or Dry	Re-emergence	Off-Site Source	Aquatic-Flowing	Aquatic-Pond	Herb. Wetland	Shrub Wetland	Herb. Upland	Shrub/Tree Upland	<0.1	0.1-1.0	>1.0-10.0	>10.0	None	Low	Moderate	High
BF- 211	-	Whitney Spring	11S 0252858 4410563	X								X					X				X		
BF- 212	-	North Bedell Flat Troughs	11S 0254719 4418232						X	X	X	X		X		X				X			
BF- 213	-	Bedell Flat Water Tank	Not recorded						X						X	X				X			
BF- 214	-	South Bedell Flat Troughs/Ponds	Not recorded						X		X			X		X				X			
HONEY LAKE VALLEY																							
HLV- 161	161	Habitation Flowing Well, 4008 T-2	Pending Access																				
HLV- 162	162	Orchard Well, 400 T	10T 0746585 4462005			X						X			X		X						X
HLV- 163	163	North Honey Lake Valley "Seep"	10T 0746102 4462822			X						X			X	X						X	
HLV- 164	164	Flowing Well 4021 T	10T 0746702 4462829			X					X	X				X						X	
HLV- 165	165	High Rock Spring	Pending Access																				
HLV- 168	168	Sulphur Spring	11T 0264553 4462196	X						X	X	X					X					X	
HLV- 169	169	SW Flowing Well, 3891	11T 0263343 4462515			X				X		X					X					X	
HLV- 170	170	SW Flowing Well, 3902	11T 0261987 4463610				X								X	X				X			
HLV- 171	171	South Fence Flowing Well	11T 0262467 4466099			X				X	X	X						X					X
HLV- 172	172	Flowing Well south of Houses	11T 0262421 4466326			X				X		X			X			X					X
HLV- 173	173	Well W of Road and Ranch	11T 0262320 4466348			X				X	X	X					X					X	
HLV- 174	174	First Well No of Round Hole	11T 0262384 4466505			X				X	X	X					X						X
HLV- 175	175	Second Well No of Round Hole	11T 0262372 4466585			X				X		X						X					X
HLV- 176	176	Old Structure Flowing Well, 3901	11T 0261069 4467381			X				X		X					X						X
HLV- 177	177	Rotten Egg Spring	11T 0261371 4468053	X						X		X						X					X
HLV- 178	178	Flowing Well 3866, E of Rotten Egg Spring	11T 0261553 4468217			X				X		X					X					X	
HLV- 179	179	S-most Flowing Well/Spring S of Laird Spring	11T 0260047 4470877	X		X				X	X	X							X				X
HLV- 180	180	Second Spring S of Laird Spring	11T 0260021 4470666	X								X						X					X
HLV- 181	181	First Flowing Well S of Laird Spring	11T 0260013 4471023				X					X		X		X					X		
HLV- 182	182	First Spring S of Laird Spring	11T 0259748 4471124		X							X					X					X	
HLV- 183	183	Laird Spring	11T 0259768 4471765	X						X		X				X						X	
HLV- 200	-	Unknown Water Feature, Alfalfa Field	Feature Not Found																				

TABLE A-1. SPRING/SEEP/WELL SURVEY IN NORTH VALLEYS PROJECTS AREA, JULY 2004

Map and Site No.	1990 JBR Field No.	Site Name	GPS Coordinates (UTM)	Water Feature						Habitat(s)						Estimated Size (acres)				Potential Suitable TES Butterfly Habitat			
				Spring	Seep	Well-Flowing	Well-Pumped or Dry	Re-emergence	Off-Site Source	Aquatic-Flowing	Aquatic-Pond	Herb. Wetland	Shrub Wetland	Herb. Upland	Shrub/Tree Upland	<0.1	0.1-1.0	>1.0-10.0	>10.0	None	Low	Moderate	High
HLV- 201	-	Desert Well (flowing)	11T 0250405 4442703				X					X				X					X		
HLV- 202	-	Lime Rock Well (flowing)	11T 0251834 4442094				X					X					X					X	
HLV- 203	-	Ferrel Playa Well	11T 0252601 4442382						X	X	X	X						X					X
HLV- 204	-	Fish Springs	11T 0254186 4442889				X							X	X	X				X			
HLV- 205	-	Unknown Water Feature, Fish Springs Ranch	Feature Not Found																				
HLV- 206	-	Unnamed Spring	11T 0255503 4444575	X								X			X	X						X	
HLV- 215	-	HLV Sec. 18 Unnamed Seep	Pending Access																				

Source: Westech 2004a

Note: The majority of map numbers and site names derive from "Spring and Seep Technical Report" (and Addendum), prepared for Western Water Development Company by JBR Consultants Group (1990a, 1990b). Prefixes have been added to map numbers (DVC, BF, HLV) to clarify the respective potential areas of drawdown: Dry Valley, Bedell Flat, Honey Lake Valley. JBR field numbers have been retained for reference to detailed field notes appearing in those reports (see Exhibits 1-5).

APPENDIX B

Riparian Survey in Proposed Pipeline Corridors

TABLE B-1. Riparian Survey in Proposed Pipeline Corridors, North Valleys Projects

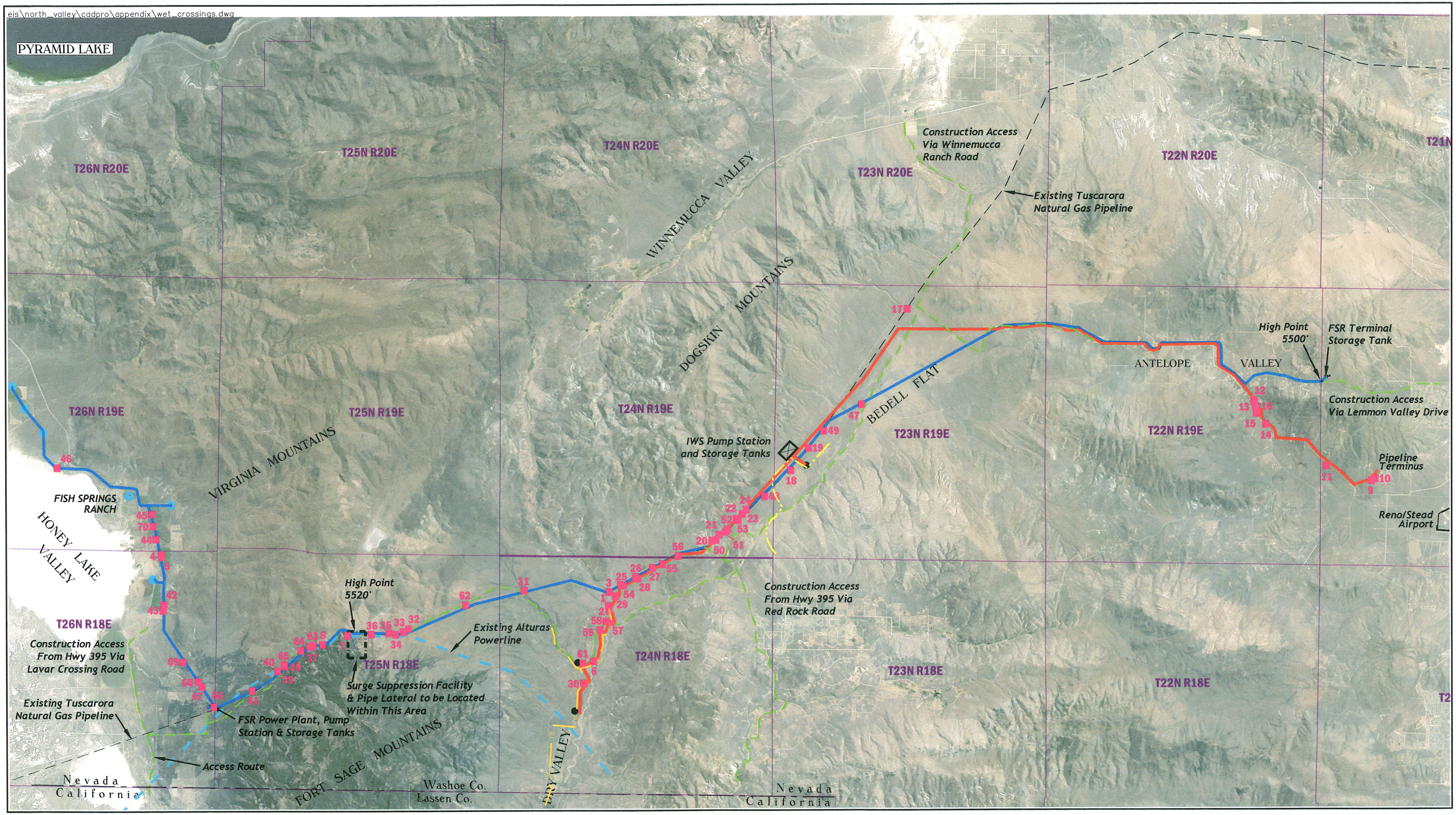
Map Number[1]	Location (GPS UTM Coordinates)[2]	Site Description
1	11S E0250270 N4425733	Wet meadow adjacent to a flowing creek. Total area is approximately ½ acre and is at the edge of the proposed disturbance corridor.
2	11S E0250106 N4425720	Vernally wet creek bed, dry at time of survey but with *Eleocharis*, *Juncus* and *Salix* species present. Bed is 3-4 feet wide.
3	11S E0250760 N4425710	Wetland vegetation along and in flowing creek. Line of green vegetation is approximately 6 feet wide.
4	11T E0252293 N4441802	Potential wetlands on both sides of proposed corridor for perhaps 500 feet. These wetlands continue well outside the proposed disturbance corridor.
5	11T E0252212 N4441785	Part of a complex of potential wetlands that occur in the area that borders the proposed corridor for 500-700 feet and continue outside the corridor.
6	11 E0248333 N4426300	Small spring-fed channel with adjacent meadow. Vegetation is approximately 3 feet wide.
7	11T E0249356 N4434916	Small potential wetland, dry at time of survey but with wetland indicator species. This is at the proposed surge suppression facility by Fish Springs. About 5 feet wide and 250 feet long.
8	11T E0249053 N4435786	Small seep area, about 40 feet wide, heavily utilized by cattle.
9	11S E0254278 N4398955	Small bed 1-2' and bank 6-12", not well-defined. Sandy bed with scant vegetation.
10	11S E0254346 N4398810	Two small drainages merge. Bed 1-2' wide, bank 4-12". Coarse sandy bed with scant vegetation.
11	11S E0254817 N4400528	Small but distinct channel, bed 1-2' wide, bank < 1'. Some vegetation in the sandy bed.
12	11S E0257146 N4403020	Small drainage not well-defined. 1-2' bed, bank <1'. Sand and gravel bed with some annual forbs.
13	11S E0257101 N4402990	Well-defined drainage with a 2-3' bed and a bank 1-2'. Coarse gravel and sand deposits in bed.
14	11S E0256313 N4402620	Well-defined drainage with a 1-2' bed and a bank 6-18". Coarse sand in the bed with some vegetation.
15	11S E0256697 N4402930	Large drainage with several side channels. This drainage eventually parallels the road. Bed 3-4' wide, bank 8"-2'. The bed has sand, rock and boulders, with some shrub vegetation.
16	11S E0256897 N4402951	Well-defined bed 1-2' wide and the bank is 8"-2'. Sandy bed with some shrub vegetation.
17	11S E0260551 N4415124	Large drainage with a bed 3-7' wide and a bank of 1-5'. Bed is coarse sand, gravels and rock with some shrub vegetation.
18	11S E0254932 N4419282	Broad U-shaped drainage. Bed is approximately 3' and vegetated. The bank is indistinct.
19	11S E0255705 N4418650	Well-defined drainage with a 1-2' bed and a 6-18" bank. Coarse sand, rock and gravels in bed.
20	11S E0252499 N4422051	Small channel with a 1-2' bed and 3-18" bank. Coarse sand and gravel in bed.
21	11S E0252701 N4421805	Well-defined drainage with coarse gravel and rock deposits. Bed is 1-2' wide and bank is up to 2'.
22	11S E0253250 N4421203	Well-defined drainage with a flat, sandy bed 1-2', bank 6"-2'.
23	11S E0253421 N4420987	Well-defined drainage with a sandy bed 1-2', bank 6"-3'.
24	11S E0253571 N4420852	Weakly defined drainage with coarse sand, rock and gravel deposits. Bed 1'and bank 6-18".

Map Number[1]	Location (GPS UTM Coordinates)[2]	Site Description
25	11S E0251003 N4425295	Weakly defined drainage with rocky bed 1'wide, bank 2-12". Some vegetation in the channel.
26	11S E0251274 N4424773	Broad rocky drainage with a 3-5' bed, bank is less distinct, 3-18". Some vegetation in the bed.
27	11S E0251579 N4424171 11S E0251208 N4424686	Two channels merge at this point. Bed has rocky gravel 3'-6', bank 1-2'. Some vegetation in channel.
28	11S E0250604 N4425487	Convergence of several channels. Bed is coarse sand 2-3', bank <1.5'. Some low vegetation in bed.
29	11S E0247563 N4426655	Broad wash with coarse sand to large rocky channel. Bed 1-3', bank 1-2'.
30	11S E0250842 N4428702	Well-defined drainage with a broad rock and gravel bed up to 3.5', bank 1-2'.
31	11T E0249562 N4432771	One of several small erosion channels not particularly well-defined. Bed is < 1.5' and bank is < 1'. Bed is vegetated.
32	11T E0249455 N4432953	Better-defined drainage. Bed is coarse sand and rock 1-2', bank to 4'. Bed is vegetated.
33	11T E0249377 N4433223	Weakly defined channel. Bed of coarse gravels 1' wide, bank < 1'. Some vegetation in bed.
34	11T E0249430 N4433460	Well-defined drainage. Bed of coarse sand to rock 1-2' wide, bank 1-3'.
35	11T E0249391 N4434076	One of many channels that dump into a larger drainage that borders the road. Bed is coarse sand and gravel 6"-1' wide, bank 3-18".
36	11T E0248974 N4436236	Small, sandy bed less than 1' wide, bank 1-1.5'.
37	11T E0248309 N4437130	Deep channel with a sandy/silty bed 1-3' wide, bank up to 5'. Some vegetation in the bed with spring-fed water just down the channel.
38	11T E0248309 N4437130	Deep channel with a silty bed 1-3' wide, bank up to 4'.
39	11T E0248141 N4437389	Small drainage with a rocky bed 1-2' wide, bank 1-2'.
40	11T E 0247461 N4438292	Deep drainage by the road. Sand, gravel and large rock in the 1-3' wide bed, bank to 1.5'. Bed is vegetated.
41	11T E0250536 N4441931	Drainage ditch from a culvert that drains irrigated fields. Moist soil and wet vegetation in the 1.5' bed, no defined bank.
42	11T E0250329 N4441968	Another drainage ditch with flowing water and hydrophilic vegetation. Bed is about 1' wide with a low bank.
43	11T E0252832 N4441975	Small muddy depression fed by a drainage channel. Channel bed is 1' wide and 6-12" tall. Larger depression may be a pond early in the season.
44	11T E0253717 N4442106	Small drainage ditch with silty deposits in the 1'wide vegetated bed. Bank is 3-12". The water comes from a culvert that runs under the road from the irrigated fields on the other side.
45	11T E0256503 N4444598	Substantial drainage with a sandy to coarse rocky bottom. Bed is 10' wide and up to 4' tall.
46	11S E0257213 N4416777	Poorly defined drainage, evidence of motorcycle use. Bed is sandy and 15-20' wide, bank 2-3'.
47	11S E0254034 N4420211	Coarse gravel bed 1.5-3' wide, bank to 2'.
48	11S E0256305 N4418124	Poorly defined drainage, bed of fine gravel 3-4'wide, bank 1-1.5'. Vegetation present in channel.
49	11S E0252514 N4421921	Well-defined drainage, bed is sand, gravel and rock 1-2' wide, bank 3-12". Evidence of recent flow & deposition.

Map Number[1]	Location (GPS UTM Coordinates)[2]	Site Description
50	11S E0252816 N4421573	Poorly defined drainage bed is coarse gravel and rock 8"-2' wide, bank 2-4".
51	11S E0252889 N4421515	Weekly defined drainage bed is gravel and rock 8"-2' wide, bank 3-12".
52	11S E0253202 N4421139	Well-defined drainage. Bed of sand and gravel 1-2.5' wide, bank 2"-3'.
53	11S E0250977 N4425203	Broad drainage. Bed is rock and gravel 2-8' wide, bank 6"-1.5'.
54	11S E0251706 N4423808	Broad drainage. Bed is rock and gravel 6-8' wide, 12-16". Some vegetation grows in the channel.
55	11S E0251986 N4423252	Poorly defined channel. Bed is gravel and fine sand 12-16" wide, bank 3-6".
56	11T E0249676 N4425662	Two channels converge into one broad drainage channel. Each channel has a rock and gravel bed 3-6'wide, bank is 4-18".
57	11T E0249719 N4425830	Well-defined drainage. Bed is rock and gravel 1-2' wide, bank is 2-12".
58	11T E0249428 N4426050	Small drainage channel. Bed is rock, sand and gravel 1-2' wide, bank is 2-6".
59	11T E0240989 N4426140	Shallow drainage channel. Bed is rock and gravel 1-3' wide, bank is 2-4".
60	11T E0248257 N4426685	Shallow drainage channel. Bed is rock and gravel 2-6' wide, bank is 2-4".
61	11T E0250364 N4430755	Shallow drainage channel. Bed is rock and gravel 2-4' wide, bank is 2-8".
62	11T E0249022 N4436123	Well-defined drainage. Bed is sand and rock 6-24" wide, bank is 3"-3'. Like a small arroyo.
63	11T E0248854 N4436559	Well-defined drainage. Bed is sand and silt 1-3' wide, bank is 6-12".
64	11T E0248362 N4437145	Shallow drainage. Bed is rock and sand 1-2' wide, bank is 3-12".
65	11T E0246919 N4439640	Well-defined drainage. Bed is coarse rock and sand 3-6' wide, bank is 1-2'.
66	11T E0247630 N4440346	Shallow drainage. Bed is rock, gravel and sand 1-3' wide, bank is 3-6".
67	11T E0247816 N4440482	Wide but shallow drainage. Bed is rock and sand 6-8' wide, bank is 2-6".
68	11T E0248511 N4441003	Shallow and somewhat wide drainage. Bed is sand and rock 3-6' wide, bank is 2-6".
69	11T E0253297 N4442074	Very wide but shallow drainage. Bed is coarse sand and gravel 5-15' wide, bank is 2-8".

[1] See attached Figure for site locations.
[2] Datum NAD 27

Source: Westech 2004b



LEGEND

- IWS — INTERMOUNTAIN WATER SUPPLY
- FSR — FISH SPRINGS RANCH
- PROPOSED ACCESS ROUTES
- TUSCARORA NATURAL GAS PIPELINE
- ALTURAS POWERLINE
- TOWNSHIP AND RANGE
- PROPOSED IWS WATERLINE
- PROPOSED FSR WATERLINE
- PROPOSED UNDERGROUND ELECTRIC
- PROPOSED ABOVEGROUND ELECTRIC
- PROPOSED IWS WELL
- PROPOSED FSR WELL
- 20 WETLAND CROSSINGS

N

0 Miles 2

Drainage Channel Crossings
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
APPENDIX B-1

APPENDIX C

Groundwater Model Summaries And Evaluation

APPENDIX C
GROUNDWATER MODEL SUMMARIES AND EVALUATION

This appendix provides a summary and evaluation of groundwater flow models performed for the three basins that would be subject to groundwater pumping for the Proposed Actions: Honey Lake Valley (Fish Springs Ranch Project); and Dry Valley and Bedell Flat (Intermountain Water Supply Project). In addition, summaries of previous hydrologic models and studies performed for Honey Lake Valley are included, as well as some of the critiques that were provided for some of the previous models.

HISTORY OF PREVIOUS MODELS

Several groundwater models have been developed for eastern Honey Lake Valley over the past 15 years. Recently, groundwater flow models also have been completed for proposed pumping at Dry Valley and Bedell Flat. The following is a chronological summary of the primary groundwater models that have been completed for the Proposed Projects:

- In 1990, the U.S. Geological Survey (USGS; Handman *et al.* 1990) developed a four-layer finite difference flow model using MODFLOW®. This model was used by the USGS to simulate withdrawal of groundwater from five irrigation wells at a rate of 5,900 af/yr for 1988 baseline conditions, and withdrawal from 18 wells at a rate of 15,000 af/yr for potential development conditions.

- In 1991, William E. Nork, Inc. (1991) developed a finite-element model for eastern Honey Lake Valley. A solute transport model was completed by Bohm (1991) to evaluate effects of pumping on groundwater quality at Fish Springs Ranch.

- In 1993, the original USGS MODFLOW model for eastern Honey Lake Valley was modified for the "Bedell Flat Pipelines Rights-of-Way Draft EIS" (BLM 1993), simulating 13,000 af/yr of groundwater withdrawal from wells at Fish Springs Ranch and 2,000 af/yr from wells at the Sierra Army Depot. The 1993 model extended the model boundary approximately 3 miles to the west relative to the 1990 USGS model boundary to incorporate the Depot. The groundwater flow model completed for the "Bedell Flat Pipelines Rights-of-Way Draft EIS" (BLM 1993) also includes a solute transport model to evaluate groundwater quality effects from pumping.

- In 2000, Lahontan GeoScience (2000) ran the original 1990 USGS MODFLOW model at pumping rates of 5,900 af/yr (1988 conditions), 8,000 af/yr, 10,000 af/yr, and 15,000 af/yr using the same hydrologic data used by the USGS. In 2003, Lahontan completed a sensitivity analysis of predicted groundwater outflow to Pyramid Lake Valley using the 1990 USGS version of the MODFLOW model.

- In 2000, Moll (2000) completed a new MODFLOW model for southeastern Honey Lake Valley as part of an M.S. Thesis for the University of Nevada-Reno. This model excluded a portion of the east-northeast side of the previous model area where a general head boundary was used, resulting in the elimination of groundwater flow east to Smoke Creek Desert and Pyramid Lake Valley, and underflow recharge from the southeastern Virginia Mountains area. Moll calculated recharge using different methods than previously used for the 1990 and 1993 models. Moll's model also used different evapotranspiration rates and extinction depths.

- In 2004, Lahontan GeoScience (2004) modified the original 1990 USGS MODFLOW model to simulate pumping groundwater from six wells at Fish Springs Ranch at a combined rate of 8,000 af/yr. The 2004 model shifted the western model boundary approximately 5 miles to the east relative to the original 1990 USGS model boundary to coincide with a hydrologic divide, and used general head boundary cells to represent the western model boundary. Results of Lahontan's 2004 model are presented in this Final EIS to represent the Proposed Action for Fish Springs Ranch (i.e., 8,000 af/yr pumping rate). This report was amended in February 2005 (Lahontan 2005). See more information about this model below.

- In 2004, Interflow Hydrology (2004) completed a numeric groundwater flow model for Bedell Flat simulating pumping 500 af/yr from one well in the northwestern part of the basin. This report was amended in December 2004 and February 2005.

- In 2005, Interflow Hydrology (2005a) completed a numeric groundwater flow model for Dry Valley using two pumping wells totaling 3,000 af/yr in the west-central part of the basin. These results were incorporated into the May 2005 Draft EIS for the North Valleys Rights-of-Way Projects. For this Final EIS, however, Interflow Hydrology (2005b) reduced the total pumping rate to 2,000 af/yr and increased the number of production wells to five. Results of this latest modeling effort for Dry Valley are presented in this Final EIS to represent Intermountain Water Supply's Proposed Action for Dry Valley (i.e., 2,000 af/yr pumping rate).

CHRONOLOGICAL SUMMARY OF HYDROGEOLOGIC INFORMATION

The following is a chronological summary of key hydrogeologic studies, reports, and models that have been completed in the Projects Areas, including Honey Lake Valley, Dry Valley, and Bedell Flat:

<u>1967</u>: USGS report on Water Resources Appraisal of the Warm Springs-Lemmon Valley Area (Rush and Glancy 1967).

<u>1990</u>: USGS report on Surface Water Hydrology of Honey Lake Valley (Rockwell 1990).

<u>1990</u>: Report on Isotope Hydrology of Southern Honey Lake Valley (Bohm 1990).

<u>1990</u>: USGS report on Ground-Water Resources of Honey Lake Valley, and the original MODFLOW model for this area (Handman *et al.* 1990).

<u>1990</u>: Technical report and addendum on Spring and Seep Survey (JBR Consultants Group 1990).

<u>1991</u>: In March 1991, the Nevada State Engineer approved Washoe County's plan to import 13,000 af/yr of groundwater from Honey Lake Valley approximately 40 miles north of Reno. The State Engineer's decision was appealed by Lassen County, California and the Pyramid Lake Paiute Tribe. The State Engineer's approval was reversed and remanded in

1992 by Second Judicial Court in Reno. In October 1992, the State Engineer issued a Supplemental Ruling that again approved inter-basin transfer of 13,000 af/yr. A motion to vacate that ruling was denied by the Second Judicial Court in February 1993. The case was subsequently appealed to the Nevada Supreme Court, which confirmed the Supplemental Rulings on Remand in June 1996. This water right was later acquired by Fish Springs Ranch.

<u>1991</u>: Report on Effects of Pumping on Ground Water Quality in the Fish Springs Aquifer System (Bohm 1991).

<u>1991</u>: Synopsis report of Drilling and Testing at Fish Springs Ranch and Development of a Finite-Element Model of Ground-Water Flow in Southeastern Honey Lake Valley (William E. Nork, Inc. 1991).

<u>1991</u>: Preliminary Analysis of the Hydrogeology of the Honey Lake Basin and Analysis of the Effects of Ground Water Withdrawal and Exportation for the Proposed Truckee Meadows Project (Mayo and Associates 1991; Slosson and Associates 1991).

<u>1992</u>: Report on the Application of Ground-Water Flow Models as Predictive Tools – A Review of Two Ground-Water Models in Eastern Honey Lake Valley (Mayo and Slosson 1992).

<u>1993</u>: Draft EIS published by BLM for "Bedell Flat Pipelines Rights-of-Way, Washoe County, Nevada." Includes MODFLOW based on the 1990 USGS model, with some modifications.

<u>1993</u>: Evaluation report of Groundwater Modeling in the 1993 Draft EIS for Bedell Flat Pipelines Rights-of-Way prepared for Lassen County, California (Principia Mathematica 1993).

<u>1994</u>: Work on the Final EIS for Bedell Flat Pipelines Rights-of-Way was suspended by the Secretary of the Interior pending resolution of the following issues: 1) concurrence of USGS on regional groundwater modeling; 2) Sierra Army Depot groundwater contamination; and 3) concurrence from the Pyramid Lake Paiute Tribe on Trust Responsibility issues.

<u>1996</u>: Masters Thesis Report by W.D. Webber (April 1996) on Salinization of Shallow Ground Waters in Honey Lake Valley.

<u>1997</u>: Masters Thesis Report by A.R. Varian (August 1997) on Use of Environmental Isotopes to Investigate Hydrologic Processes at Honey Lake Basin.

<u>2000</u>: Report on Hydrogeology of Dry Valley (Stantec Consulting and Cordilleran Hydrology 2000).

<u>2000</u>: Masters Thesis Report by N.A. Moll (May 2000) on A Groundwater Flow Model of Eastern Honey Lake Valley.

<u>2001</u>: USGS report on Hydrogeologic Framework of Antelope Valley and Bedell Flat (Berger *et al.* 2001).

2002: Nevada State Engineer approves water right of 3,000 af/yr for Intermountain Water Company pumping in Dry Valley (inter-basin transfer).

2003: Report on Sensitivity Analysis of Predicted Groundwater Outflows to Pyramid Lake (Lahontan GeoScience 2003).

2003: Report on Estimated Groundwater Recharge to Dry Valley by the Desert Research Institute (DRI) of Reno, Nevada.

2003: Report on Hydrogeology of Bedell Flat and Potential for Ground Water Development (Interflow Hydrology and Cordilleran Hydrology 2003).

2004: USGS report on Estimates of Natural Ground-Water Discharge in Dry Valley (Berger *et al.* 2004).

2004: Nevada State Engineer approves water right of 144 af/yr for Intermountain Water Supply pumping in Bedell Flat (inter-basin transfer). Intermountain Water Supply initially requested a water right for 500 af/yr for pumping groundwater in Bedell Flat. Intermountain Water Supply has appealed the State Engineer's decision to grant a water right for 144 af/yr, as well as submitted another water right application for the additional 356 af/yr that would provide for a total of 500 af/yr originally requested.

2004: Report on Numeric Ground-Water Flow Modeling for Bedell Flat (Interflow Hydrology, November 2004; amended December 2004 and February 2005) simulating 500 af/yr total pumping from two production wells in Bedell Flat.

2004: Report on Comparison of Evapotranspiration Rates used in the 1990 USGS Ground-Water Model of Honey Lake Valley to More Recent Estimates (Walker and Associates 2004).

2004: Report on Groundwater Flow Modeling for Fish Springs Ranch (Lahontan GeoScience, September 2004).

2004: Report on Special Status Plant Survey and Spring/Seep Survey for North Valleys Rights-of-Way Projects (WESTECH Environmental Services 2004).

2004: USGS report on Ground-Water Pumpage and Artificial Recharge Estimates and Average Annual Natural Recharge and Interbasin Flow by Hydrographic Area, Nevada (Lopes and Evetts 2004).

2005: Amended Report on Numeric Ground-Water Flow Modeling for Bedell Flat (Interflow Hydrology, February 2005) simulating 500 af/yr total pumping from two production wells in Bedell Flat.

2005: Report on Numeric Ground-Water Flow Modeling for Dry Valley (Interflow Hydrology, February 2005a) simulating 3,000 af/yr total pumping from two production wells. This Proposed Action used in the Draft EIS was revised by Interflow Hydrology (August 2005b) by reducing the proposed pumping rate to 2,000 af/yr from five wells.

COMMENTS ON PREVIOUS MODELS

Subsequent to completing the 1990 USGS MODFLOW model and the 1993 modified MODFLOW model presented in the Draft EIS for "Bedell Flat Pipelines Rights-of-Way", several investigators have reviewed and commented on the models completed for groundwater extraction in Honey Lake Valley. Following are summaries of some of the investigators' reports.

Mayo, A.L., and J.E. Slossen, 1991. Preliminary Analysis of the Hydrogeology of the Honey Lake Basin, California-Nevada, and Analysis of the Effects of Ground Water Withdrawal and Exportation for the Proposed Truckee Meadows Project. Prepared for Lassen County, California.

Mayo, A.L., and J.E. Slosson, 1992. The Application of Ground-Water Flow Models as Predictive Tools – A Review of Two Ground-Water Models of Eastern Honey Lake Valley, California-Nevada. Bulletin of the Association of Engineering Geologists, Vol. XXIX, No. 2, pp. 151-163.

- Mayo and Slosson review two groundwater models completed for eastern Honey Lake Valley: USGS (Handman et al. 1990) and Truckee Meadows Project (TMP) (Western Water Development Company 1990 or William E. Nork 1991).

- USGS Model is a 4-layer finite difference MODFLOW model. Recharge from precipitation is 4,200 af/yr. It was necessary to increase recharge 37% (additional 5000 af/yr). About 55% of total recharge was assigned to stream flow infiltration. Most groundwater discharge was assigned to evapotranspiration (ET) (54% to 65%). About 30% of groundwater discharge was underflow to the northeast (Smoke Creek Desert) and east (Pyramid Lake Valley).

- TMP model is a single 1,000-ft thick layer 2-dimensional finite element. About 95% of groundwater recharge (18,000 af/yr) was via fault zones in the southern Virginia and Fort Sage mountains.

- Conclusions for USGS model: Construction of 4 layers in the model is not substantiated and geologic conditions do not seem to warrant 4 layers. Estimated aquifer recharge rates are too high from precipitation and stream bed infiltration. Consumptive groundwater use by phreatophyte ET (up to 65%) was overestimated by as much as 50% because of incorrectly using extinction depth – a linear function was used up to 36 feet and ignored seasonal variations. Using 30% groundwater discharge to the east and northeast may be too high or nonexistent. General head boundary conditions were selected without any substantiation. Net effect of constant-head boundaries is to greatly underestimate groundwater declines along the western model boundary. Predicted aquifer response under the 15,000 af/yr scenario is implausible because this simulation required additional groundwater recharge beyond the recharge predicted for 1988 steady-state conditions.

- Conclusions for the Nork or Western Water Development TMP model: Groundwater discharge was over-predicted by 400 to 500 percent. No justification for arbitrary concentration of all natural discharge in central playa area. Model was improperly calibrated. Lack of evidence for significant groundwater recharge from southern model boundary.

- Conclusions for the Bohm solute transport model: Upper limit of 1000 ppm was assigned for chloride even though actual concentrations are much higher. Serious flow and solute mass balance imbalances exist. Model could not predict movement of poor quality water from outside the model domain or predict effects of pumping on CA portion of basin.

Principia Mathematatica, Inc., 1993. Evaluation of the Draft Environmental Impact Statement, Bedell Flat Pipelines Rights-of-Way, Washoe County, Nevada. Prepared for County of Lassen, California. September 10, 1993.

- Groundwater flow and solute transport models completed by WESTEC for the 1993 Draft EIS indicate that much of the water produced at Fish Springs Ranch would come by reduction in evapotranspiration (ET). Principia claims ET is greatly overestimated, so the amount of ET that can be "salvaged" to other uses is too high.

- Data utilized by WESTEC in both flow and solute transport models are highly uncertain, interpretations concerning them are weak, and attempts to reduce the uncertainty were deficient. Therefore, model results utilizing these data are, scientifically speaking, total unreliable.

- Conclusions for the WESTEC models: Assignments of surface elevation values to model grid cells is only moderately accurate. Assignment of bedrock elevation values to flow model grid cells is incorrect and unsupported. Assignment of property values to geologic features represented in the models is based totally on unverified assumptions. Water level and water quality data are not analyzed, and inferences drawn from these data are not reported. Groundwater information has not been completely characterized nor utilized properly for purposes of modeling, and assumptions are unverified. The numerical grid cell system is too coarse to provide reliable results. The vertical layering choice for the model is based on unverified assumptions. The representations of both groundwater flow and solute transport mechanisms for purposes of modeling are fatally flawed.

- WESTEC responded to the Principia report in a Memorandum dated February 28, 1994.

In the most recent version of the Fish Springs Ranch model, Lahontan (2004) reviewed information for the Study Area obtained since 1990. In response to the primary criticisms presented above, the following changes were made by Lahontan (2004) to the Fish Springs Ranch model, or a response is provided to the criticism:

- Improved estimates of evapotranspiration (ET) parameters were incorporated into ET Package cells in the model. For discharge components, the Proposed Action uses a lower groundwater ET rate (6,280 to 8,634 af/yr) versus the rate estimated for year 2003 baseline conditions (10,400 af/yr). This difference is due to declining ET as the water table is lowered by pumping 8,000 af/yr at Fish Springs Ranch.

- The 2004 model incorporates changes in the extinction depths for phreatophytes (30 feet everywhere except 12 feet in playas, versus 24 feet for most of the 1990 USGS model area) and the maximum evapotranspiration rate (40 in/yr versus 48 in/yr used in the 1990 USGS model).

- The central and southern portion of the western boundary of the model was converted to a general head boundary to reflect the apparent groundwater divide in this area.

- Recent water level data were used as calibration targets and the model was run to demonstrate that the model was still calibrated.

- The coarse model grid size (32 rows and 14 columns) was maintained throughout all versions of the model to allow consistent comparison of model results.

- Justification of layers and properties assigned to geologic features used in the model are described in the USGS model report (Handman *et al.* 1990).

- With respect to aquifer recharge rates being too high from precipitation and streambed infiltration, these values were obtained by the USGS (Handman *et al.* 1990). Distribution of mean annual precipitation in Honey Lake Valley was obtained from the California Department of Water Resources for 1958-86. Direct infiltration of precipitation was estimated using the Deep Percolation Model. The stream flow recharge estimate of 13,000 af/yr was made using date in the northern and eastern portions of Honey Lake Valley, from Spencer Creek near Herlong to Fort Sage Creek near Flanigan.

- This Final EIS acknowledges the uncertainty about groundwater flow eastward from Honey Lake Valley through the Sand and Astor Pass areas to Smoke Creek Desert and Pyramid Lake Valley. Moll (2000) excluded groundwater flow to these eastern valleys from her model (i.e., no-flow boundary), with model results showing groundwater drawdown predictions that are similar to those predicted using the 2004 model for the Proposed Action pumping rate of 8,000 af/yr.

Some investigators of the eastern Honey Lake Valley hydrologic system believe there is little or no groundwater flow to Smoke Creek Desert and Pyramid Lake Valley (Bohm 1990; Moll 2000; Varian 1997). The following are summaries of these reports.

<u>Bohm B., 1990. Isotope Hydrology of Southern Honey Lake Valley, Nevada and California. Plumas Geo-Hydrology. Prepared for Washoe County Department of Public Works, Reno, Nevada. August 30, 1990.</u>

- Study used isotope (deuterium, oxygen-18, and tritium) and water quality data collected from about 100 sampling sites. Appendix C in the Bohm report lists all data used, including temperature, pH , electrical conductivity, Ca, Mg, Na, K, Cl, HCO_3, SO_4, NO_3, F, SiO_2, As, B, Fe, and Mn. Flow rate at springs was estimated during sampling.

- Deuterium enriched groundwater north and northwest of Wilson well area suggests evaporation in a groundwater sink. It appears that groundwater flow systems of the entire southern Honey Lake Valley flow into the area north and northwest of the Wilson well. Figure 2 in the Bohm report shows area of high total dissolved solids (TDS) located northwest of Wilson well area and trending northeast to Astor Pass area. This could be interpreted to support groundwater flow to Pyramid Lake through the Pass, but this is not consistent with the deuterium data.

- Wilson, Ford, and Nork wells produce water with different temperature, isotopic, and chemical composition than wells to the east (i.e., they have a different source). Groundwater in the western area is derived from the Warm Springs Fault Zone and may include cooled geothermal waters. Groundwater in the eastern area originates from precipitation in the Virginia Mountains, possibly as far south as Tule Peak. The peak is out of the topographic drainage basin, but unmapped geologic structures may allow for subsurface flow.

- Part of Long Valley groundwater flow system may discharge to high TDS area northwest of Fish Springs Ranch playa. However, presence of the high TDS indicates that Long Valley groundwater does not flow to the Fish Springs Ranch well field under natural conditions.

- Possibility that groundwater from eastern Honey Lake Valley may flow into Dry Valley east of Skedaddle Mountains.

- Groundwater at Astor Pass and Sand Pass are unlike groundwater in eastern Fish Springs Ranch well field. As a result, little, if any groundwater from southeastern Honey Lake Valley migrates through Astor and Sand Pass to Pyramid Lake Valley.

- Groundwater from Hodges well area may migrate to the west and/or north into Dry Valley northeast of Honey Lake Valley.

- Significant evaporation seems to occur through the unsaturated zone, but quantifying the amount of evaporation based on chloride and isotopes exceeds scope of this study. Role of phreatophytes in evaporation is not known, but could be clarified by collecting isotope data from plant fluids. Salts accumulated in playa soil during the dry season could be flushed out by precipitation onto the valley floor.

- Groundwater flow to discharge area may also come in part from upward discharge from a bedrock aquifer at depth. Inferred faults could be a conduit.

<u>Moll, N.E., 2000. A Groundwater Flow Model of Eastern Honey Lake Valley, Lassen County, California and Washoe County, Nevada. M.S. Thesis for Hydrology, University of Nevada, Reno. May 2000.</u>

- A new MODFLOW model was constructed for eastern Honey Lake Valley.

- The Moll model used model grid spacing of 1320 feet rather than the 1 mile spacing used for the previous MODFLOW models for eastern Honey Lake Valley.

- The previous USGS MODFLOW model required the addition of 5,000 af/yr of additional inflow occurring from the southeast through volcanic rocks of the Virginia Mountains. This model could not be calibrated without a general head boundary in the northeast that discharged a substantial amount of water from Honey Lake Valley to Smoke Creek Desert and Pyramid Lake.

- The Moll model excluded a portion of the east-northeast side of the previous model area where a general head boundary was used. This eliminates groundwater flow from eastern Honey Lake Valley to Smoke Creek Desert and Pyramid Lake Valley.

- Recharge from infiltration was estimated using a Deep Percolation Model (DPM), similar to the previous models (4,200 af/yr estimated by USGS).

- Recharge from streamflow was estimated based on total stream flow in the model area of about 13,000 af/yr, similar to the previous models. There were some changes made by Moll to distribution of streamflow.

- The USGS included recharge of groundwater inflow from the Virginia Mountains area of 5,000 af/yr. Moll's model eliminates this recharge source from the model.

- The new model used a maximum evapotranspiration (ET) rate of 4 ft/yr, with an extinction depth of 22 feet for most of the area, and 18 feet in the eastern part of the basin. The previous USGS model used an ET of 4 ft/yr and the extinction depth was set at 24 feet over most of the area (maximum of 36 feet).

- Two steady-state pumping scenarios were modeled: 6,000 af/yr and 8,000 af/yr pumping. For these scenarios, total recharge and discharge for the model area is about 16,800 af/yr for each input and output.

- An attempt was made to model 9,000 af/yr of pumping, but too many cells in the southeast part of the model dried up.

- Conclusions for Moll model: Well data are sparse or lacking over much of the model area. Recharge estimates may have a large margin of error, especially stream flow infiltration. There is little hard evidence to support ET estimates. Given all sources of error, the groundwater models are only simplifications of the real system in Honey Lake Valley.

<u>Varian, Angela Resella, 1997. Use of Environmental Isotopes to Investigate Hydrologic Processes at Honey Lake Basin, Lassen County, California and Washoe County, Nevada. M.S. Thesis, Hydrogeology, University of Nevada, Reno. August 1997.</u>

- Objectives are to: 1) define isotopic character of water from recharge areas; 2) evaluate origin of shallow and deep groundwater; 3) identify groundwater flow-paths; and 4) provide suggestions for an improved conceptual groundwater model of Honey Lake Valley.

- Main processes controlling groundwater geochemistry are: 1) recharge to alluvial fans from mountains; 2) evapotranspiration (ET); 3) dissolution of evaporate salts; and 4) groundwater mixing. These processes are dependent on paleoclimate and groundwater flow controlled by geologic structures.

- For the study, 16 water samples were analyzed for major ions; others were tested for isotopes. Sample sites include monitoring wells installed at Sierra Army Depot (SIAD) to assess water quality in zones contributing to supply wells.

- Monitoring well clusters at two SIAD supply wells are 2 km apart, but differences in oxygen and carbon isotopes between these locations imply a groundwater flow barrier exists between them at depth >200 feet. Projection of the Warm Springs Fault zone from Fort Sage Mountains to the northwest passes between the two well clusters and is believed to be the groundwater flow barrier. Groundwater east of the inferred barrier is older than that to the west. Fault is referred to as an "impermeable barrier", but there is also suggestion of groundwater discharge up along the fault.

- Isotopic and geochemical data are consistent with shallow groundwater divide near state line that separates east and west portions of basin. This groundwater divide was originally proposed by Webber 1996 based on groundwater elevations.

- Isotopic and geochemical data indicate outflow to Smoke Creek Desert and Pyramid Lake Valley is unlikely.

- Water deep in the basin over 17,000 years old and recharged during colder climate; this deeper water is also much lower in arsenic (only 5 ppb). The oldest water is found throughout the basin at depths below 180 meters.

- Groundwater from the mountains flows along deep flow paths toward the center of the basin and are eventually discharged at the playa surface. Surface runoff that reaches the playa is evaporated, and any residual water will infiltrate. Mixing of the rising groundwater and infiltration occurs beneath the playa. Isotopic data collected near Fish Spring playa are consistent with groundwater discharge within an ET zone.

- Recommendations for future research include: 1) water level data from more wells of known construction; 2) more wells near the state line to better document the shallow groundwater divide; 3) more deep wells, especially near the state line to see if the divide occurs at depth; and 4) groundwater samples across proposed fault zones to assess barriers and conduits of groundwater flow.

FISH SPRINGS RANCH GROUNDWATER FLOW MODEL

In 2004, Lahontan GeoScience, Inc. (Lahontan 2004) modified the original 1990 USGS MODFLOW® model (Handman *et al.* 1990) to simulate pumping groundwater from six wells at Fish Springs Ranch at a combined rate of 8,000 acre-feet per year (af/yr) (i.e., Proposed Action). Lahontan (2005) made some minor revisions to its model report in February 2005. The updated model shifted the western model boundary approximately 5 miles to the east relative to the original 1990 USGS model boundary, and used general head boundary cells to represent the western model boundary (coinciding with a hydrologic divide). The model boundary encompasses a total area of about 450 square miles that includes most of eastern Honey Lake Valley and southern Smoke Creek Desert (**Figure 4-1**). The model has a uniform grid spacing of 1 mile throughout the model domain, consisting of 32 rows and 14 columns.

The model contains four layers: Layer 1 includes the upper water table aquifer ranging in elevation from an elevation of approximately 3,950 to 3,700 feet amsl, except in the southern portion of the model area where granitic bedrock is above 3,700 feet; this layer consists of unconsolidated deposits in the center of the basin, and coarser-grained deposits at the edge of the valley floor. Layers 2, 3 and 4 represent fine-grained lake bed sediments except where volcanic rocks are assumed. Layers 2 and 3 range in elevation from 3700 to 3000 feet amsl, and 3000 to 1500 feet amsl, respectively. Layer 4 ranges from a top elevation of 1500 feet amsl to -800 feet elevation. Layer 1 groundwater is unconfined, and Layers 2, 3, and 4 are confined.

MODFLOW incorporates several "packages" to simulate hydraulic boundary conditions and aquifer properties. Boundary conditions used in the 2004 Fish Springs Ranch model include:

- No-flow boundaries representing the valley margins and northern portion of the groundwater divide west of the state-line.
- General Head (head dependent flux) Boundary Package cells representing southern portion of the groundwater divide west of the state-line and groundwater outflow to Smoke Creek Desert and Pyramid Lake Valley.
- Well Package (constant flux boundary) cells representing infiltration from streambeds, groundwater inflow from the south, and pumping from wells.
- Recharge Package (constant flux boundary) representing recharge from infiltrating precipitation.
- Evapotranspiration Package (head dependent flux boundary) representing evaporation from the playa and transpiration from phreotophytes.

Hydraulic conductivity (K) values for geologic media in the model (basin fill deposits and volcanic rocks) were assigned to each cell initially using well test data from 36 sites in Honey Lake Valley. K-values were not modified from the original 1990 USGS version of the model during the calibration check. Fault zones were assigned in the model to better simulate measured water levels and gradients where faults are known to exist. K-values assigned to Layer 1 are:

1. Central basin fill deposits = 1 ft/day
2. Perimeter basin fill deposits = 4 ft/day
3. Northern volcanic rocks = 5 ft/day
4. Southern volcanic rocks = 45 ft/day
5. Fault zones = 0.01 to 4 ft/day

Prior to completing this model, Lahontan (2000) ran the original 1990 USGS MODFLOW model at pumping rates of 5,900 af/yr (1988 conditions), 8,000 af/yr, 10,000 af/yr, and 15,000 af/yr using the USGS hydrologic data (Handman *et al.* 1990). In 2003, Lahontan (2003) completed a sensitivity analysis of predicted groundwater outflow to Pyramid Lake Valley using the 1990 USGS version of the MODFLOW model.

In the most recent version of the model, Lahontan (2004, 2005) reviewed information for the Study Area obtained since 1990 including data obtained from the California Department of Water Resources, Sierra Army Depot, Herlong Utilities Cooperative, Washoe County, and Fish Springs Ranch. Improved estimates of evapotranspiration parameters were incorporated into Evapotranspiration Package cells in the model. The central and southern portion of the western boundary of the model was converted to a general head boundary to reflect the apparent groundwater divide in this area. Recent water level data were used as calibration targets and the model was run to demonstrate that the model was still calibrated.

Hydrologic budgets used in Lahontan's 2004-2005 groundwater model (Proposed Action) and for baseline conditions (2003) are presented in **Table C-1**. These water budgets show that total recharge and discharge rates are similar between the baseline condition in year 2003 and the Proposed Action of increasing total pumping rates to 8,000 af/yr. For the Proposed Action, there would be no irrigation return flow which will reduce recharge.

TABLE C-1
Hydrologic Budget for Groundwater Flow Model at Eastern Honey Lake Valley

Budget Components	Estimated Quantity (acre-feet per year)			
	2003 Baseline Conditions	Proposed Action Conditions at 8,000 af/yr Pumping (10 years)	Proposed Action Conditions at 8,000 af/yr Pumping (100 years)	Proposed Action Conditions at 8,000 af/yr Pumping (steady-state)
RECHARGE				
Release from Storage	0	3,164	646	0
Direct Infiltration of Precipitation	8,411	8,411	8,411	8,411
Infiltration of Surface Runoff	11,890	11,890	11,890	11,886
Irrigation Return	1,046	0	0	0
Groundwater Inflow from West (Honey Lake Area)	30	33	34	31
TOTAL RECHARGE	21,377	23,498	20,981	20,328
DISCHARGE				
Groundwater Taken Into Storage	0	36	0	0
Groundwater Evapotranspiration	10,400	8,634	6,664	6,280
Withdrawal from Production Wells	4,202	7,997	7,997	7,997
Groundwater Outflow NE to Smoke Creek Desert via Sand Pass	5,278	5,247	4,829	4,707
Groundwater Outflow East to Pyramid Lake Valley via Astor Pass	1,481	1,436	1,341	1,328
Groundwater Outflow West to Honey Lake Area	17	16	16	16
TOTAL DISCHARGE	21,378	23,366	20,847	20,328

Source: Lahontan 2005 and Groundwater Model Output Files.

For discharge components, the Proposed Action model uses declining groundwater evapotranspiration rates (8,634 af/yr for year 1; 6,664 af/yr for year 100; and 6,258 af/yr for steady-state conditions) as the water table declines due to pumping, versus the rate estimated for year 2003 baseline conditions (10,362 af/yr). The 2004-2005 model incorporates changes in the extinction depths for phreatophytes (30 feet everywhere except 12 feet in playas, versus 24 feet for most of the 1990 USGS model area).

The maximum evapotranspiration rate was reduced in the updated model (40 in/yr versus 48 in/yr used in the 1990 USGS model) (Handman *et al.* 1990; Walker & Associates 2004). Evapotranspiration rates for vegetated areas were based on a new method using measured depth to groundwater and plant canopy cover at nine locations in eastern Honey Lake Valley (Walker & Associates 2004). Results show that evapotranspiration at the nine sites ranges from 0.1 to 1.4 ft/yr, with most values in the 0.2 to 0.35 ft/yr range (Walker & Associates 2004).

Historical groundwater use since the mid-1980s at Fish Springs Ranch has consisted primarily of pumping from five wells (Hodges, Wilson, Headquarters, Jarboe, and Ferrel) for irrigation purposes (**Figure 3-5**). **Table C-2** shows pumping rates from these wells for 2003 which total about 4,200 af/yr. Estimated irrigation return flow for this water usage also is shown in **Table C-2**. The Proposed Action includes a total pumping rate of 8,000 af/yr which would be distributed among the five wells as shown in **Table C-2**. A sixth production well likely will be used, but the maximum combined pumping rate of 8,000 af/yr would not change.

TABLE C-2
Existing and Proposed Pumping Rates at Fish Springs Ranch

Well	Total Pumping Volume (af/yr)	Pumping Volume from Model Layer 1	Pumping Volume from Model Layer 2	Irrigation Return Flow (af/yr)
Irrigation Pumping at Fish Springs Ranch in 2003 (Baseline Condition)				
Hodges	544	544	0	136
Wilson	1,005	0	1,005	251
Headquarters	1,549	1,146	403	387
Jarboe	712	356	356	178
Ferrel	377	377	0	94
TOTAL	4,187	2,423	1,764	1,046 (25% of pumping)
Proposed Action Pumping at Fish Springs Ranch				
Hodges	2,000	668	1,332	0
Wilson	2,000	668	1,332	0
Headquarters	2,000	668	1,332	0
Jarboe	1,200	400	800	0
Ferrel	800	266	534	0
TOTAL	8,000	2,670	5,330	0

Source: Lahontan 2005
Note: See **Figure 3-5** for locations of irrigation wells.

Table C-2 also shows the amount of water that would be pumped from each of the upper two model layers (aquifers). Approximately one-third of project pumping was assigned to Layer 1 and two-thirds to Layer 2. Layer 1 includes the upper water table aquifer ranging from approximately 3700 to 4050 feet in elevation, consisting of fine-grained deposits (clay, silt, sand) in the center of the basin, and coarser-grained alluvial deposits (silt, sand, gravel) that surround the valley floor at the base of the mountains. Layer 2 consists almost entirely of fine-grained lake-bed sediments except where volcanic rocks are present, all of which range in elevation from about 3000 to 3700 feet amsl.

The groundwater flow model was used to simulate steady-state conditions using year 2003 as the baseline period. Baseline pumping for 2003 was approximately 4,200 af/yr. To simulate impacts from the Proposed Action, total pumping in the model was increased from approximately 4,200 af/yr to 8,000 af/yr, distributed in the two model layers as shown in **Table C-2**.

Lahontan (2004) performed a calibration check of the groundwater flow model by comparing measured groundwater levels or heads in eastern Honey Lake Valley with water levels predicted by the model for 2003 steady-state conditions. With the exception of changes in Evapotranspiration and General Head Boundary conditions prior to the calibration check, no model parameters were modified during the calibration check. To judge calibration of the modified model, Lahontan (2004) selected calibration goals of root mean square deviation (RMSD) of <5 feet and a correlation coefficient of >0.90 between simulated and measured head values. A total of 28 wells in eastern Honey Lake Valley were used as calibration targets. Calibration results included a RMSD of 4.6 feet and a correlation coefficient of 0.96 (Lahontan 2004). The ratio of RMSD to total range in head across the site was 0.05, which falls within acceptable range. Transient verification was not performed as sufficient transient data were not available.

A sensitivity analysis was performed by Lahontan (2004) on the 1990 USGS version of the model to evaluate the sensitivity of the model to varying parameters used in the model. With the exception of increasing the evapotranspiration rate by a factor of 2, varying model parameters did not result in an acceptable fit of simulated to measured head values. The model is most sensitive to changes in recharge (areal and stream recharge), and least sensitive to evapotranspiration depth and rate (Lahontan 2004). An earlier sensitivity analysis performed by Lahontan (2003) showed that changing hydraulic conductivity values at the general head boundary at Astor Pass has a direct and significant effect on groundwater outflow to Pyramid Lake Valley and Smoke Creek Desert. The level of Pyramid Lake also directly affects groundwater outflow to the lake at the Astor Pass general head boundary. As the lake level rises, groundwater outflow from eastern Honey Lake Valley to Pyramid Lake Valley decreases.

Lahontan (2005) executed transient model simulations to aid in the analysis of how groundwater drawdown will develop over time. Transient simulation requires the use of storage coefficients to allow the simulation of water withdrawn from or placed into aquifer storage. Specific yield and storativity are used to represent storage characteristics in unconfined and confined aquifers, respectively. Lahontan used a specific yield value of 0.1 and storativity values of 0.0001 and 0.00001 for the transient simulations based on the estimated range of this parameter for a confined fractured bedrock system. Storativity was varied as 94 percent of the aquifer is under confined conditions and was thought to have the greatest influence on model predictions. Varying these estimates by an order of magnitude or more, significantly impacted the predictions of drawdown over time. Discussions of drawdown over time below is based on predictions from Lahontan's (2005) transient simulation using a storativity estimate of 0.00001.

The proposed pumping rate of 8,000 af/yr at Fish Springs Ranch is predicted to cause drawdown of the water table in eastern Honey Lake Valley. Maximum steady-state groundwater drawdown contours for 8,000 af/yr pumping are shown on **Figure 4-1**. The drawdown is calculated by subtracting predicted groundwater surface elevations from baseline conditions in 2003 where net irrigation withdrawal (total pumping minus irrigation return flow) at Fish Springs Ranch was about 3,140 af/yr (**Table C-2**). Based on recent model predictions using a total groundwater pumping rate of 8,000 af/yr (Lahontan 2005), the amount of groundwater drawdown would be up to about 30 feet (at 100 years) near the production wells at Fish Springs Ranch, to <1 foot at distances of about 1 to 5 miles west and north of the production wells (**Figure 4-1**).

Maximum drawdown at the state-line would be 1 foot or less, with no drawdown occurring beyond 4 miles west of the state-line, coincident with the groundwater divide shown on **Figure 4-1** (Lahontan 2004, 2005). Maximum drawdown predicted at Astor Pass near Pyramid Lake Valley, and Sand Pass near Smoke Creek Desert, would be approximately 15 feet and 10 feet, respectively.

Figures C-1 and **C-2** in this appendix are hydrographs of groundwater drawdown versus time (0 to 100 years) developed using Lahontan's 2005 model for a well in the Sand Pass and Astor Pass area and a well in the Fish Springs Ranch area, respectively. Predicted drawdown in the Pass area well is about 1 foot at year 10, and 9 feet at year 100. Predicted drawdown in the Ranch area well is about 6 feet at year 1, and 15 feet at year 100; this well is not located in the area of maximum groundwater drawdown at Fish Springs Ranch. **Figures C-3, C-4,** and **C-5** in this appendix show the distribution of groundwater drawdown in Layer 1 throughout eastern Honey Lake Valley in plan view for 1, 10, and 100 years, respectively, after initiation of pumping 8,000 af/yr. According to Lahontan (2004), 95 percent of total groundwater drawdown is achieved in the pumping center after 100 years of pumping.

The groundwater model predicts outflow to Pyramid Lake Valley via Astor Pass would be reduced by about 140 af/yr after 100 years, and eventually 150 af/yr at steady-state or 10 percent of baseline conditions (**Table C-1**). Groundwater outflow to Smoke Creek Desert via Sand Pass would be reduced by about 450 af/yr after 100 years, and eventually 570 af/yr at steady-state, or 11 percent of baseline conditions (**Table C-1**). Due to minor groundwater drawdown (<1 foot) between the state-line and 3 miles west of the state-line, a minor decrease in groundwater outflow of about 1 af/yr would occur from east to west across the state-line (**Table C-1**). These model results also suggest that as a result of pumping, the hydraulic divide west of the state-line may be moved a short distance farther west.

DRY VALLEY GROUNDWATER FLOW MODEL

For this Final EIS, a MODFLOW® model was completed in 2005 by InterFlow Hydrology (2005b) to simulate pumping groundwater from five wells at a combined rate of 2,000 af/yr. The production wells would be located in west-central Dry Valley near existing monitoring wells DVM-1 through DVM-5 (**Figure 3-5**). The model domain encompasses an area of about 17.5 mi^2 that includes most of the lower western valley floor within Nevada (**Figure 4-2**). The model grid has a uniform grid spacing of 500 feet. For the Draft EIS, Interflow Hydrology (2005a) performed a similar model, but the proposed total pumping rate was 3,000 af/yr from two production wells.

The most recent model contains four layers: Layer 1 is the upper layer of the model, including ground surface, representing about 250 feet of Quaternary-age alluvium; Layer 2 represents a finer-grained portion of basin-fill deposits; Layer 3 represents the deeper coarser-grained basin-fill sediments; and Layer 4 represents deeper fractured volcanic tuff and granitic bedrock. Layer 1 groundwater is unconfined, Layers 3 and 4 are confined, and Layer 2 is convertible unconfined/confined. Hydraulic conductivity values used in the model are 4.0, 0.25, 1.0 and 1.0 ft/day for Layers 1 through 4, respectively. Total saturated thickness of the four layers that would be subject to groundwater extraction for the Proposed Action is a maximum of about 1,400 feet at the state-line.

Boundary conditions used in the Dry Valley model include:

- No-flow boundaries to represent valley margins.
- General Head (head-dependent flux) Boundary Package cells to represent groundwater flux across the state line.
- Well Package (constant flux boundary) to represent groundwater inflow though the fault zone, and representing underflow from fractured rock in the upper basin and/or lateral flow along the fault zone in Layer 4.
- Recharge Package (constant flux boundary) representing infiltration from streambeds and precipitation from the surrounding mountains.
- Evapotranspiration Package (head dependent flux boundary) cells representing transpiration from phreotophytes along the creek.

Hydrologic budgets resulting from the calibrated baseline model and pumping simulations are presented in **Table C-3**. For baseline conditions, the model incorporates 1,362 af/yr of groundwater recharge: 621 af/yr to Layer 1 from precipitation in the mountains; 117 af/yr from streambed infiltration; and 623 af/yr to Layers 3 and 4 from groundwater inflow. Discharge from the baseline model area includes evapotranspiration at a rate of 517 af/yr, with an assumed extinction depth of 30 feet based on existing phreatophytes. Groundwater outflow westward across the state-line to Long Valley, California is simulated at 531 af/yr, and discharge to lower Dry Valley Creek is 314 af/yr.

FIGURE C-1
Computed Drawdown at Well #37
Sand & Astor Pass Areas, Eastern Honey Lake Valley

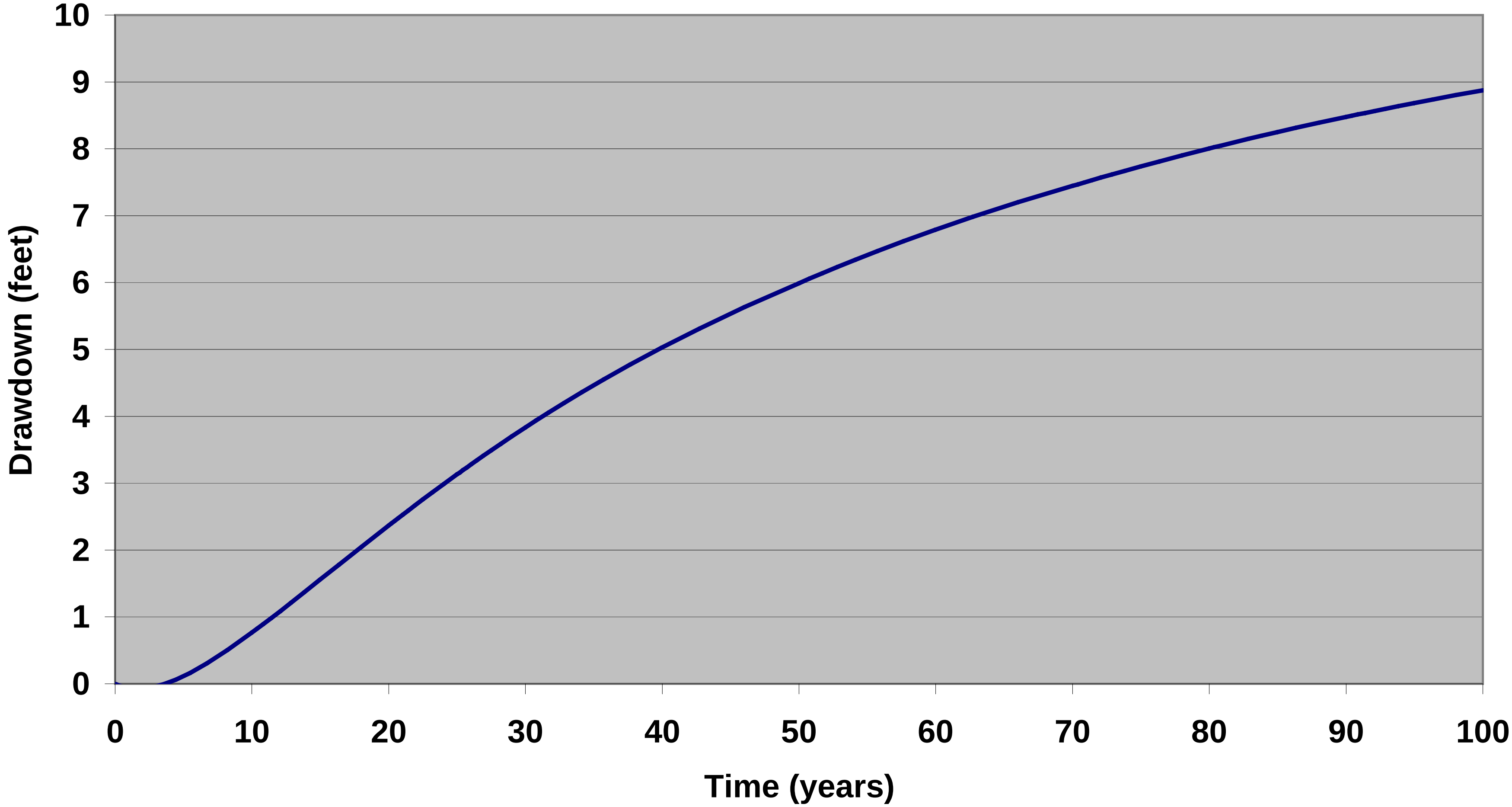
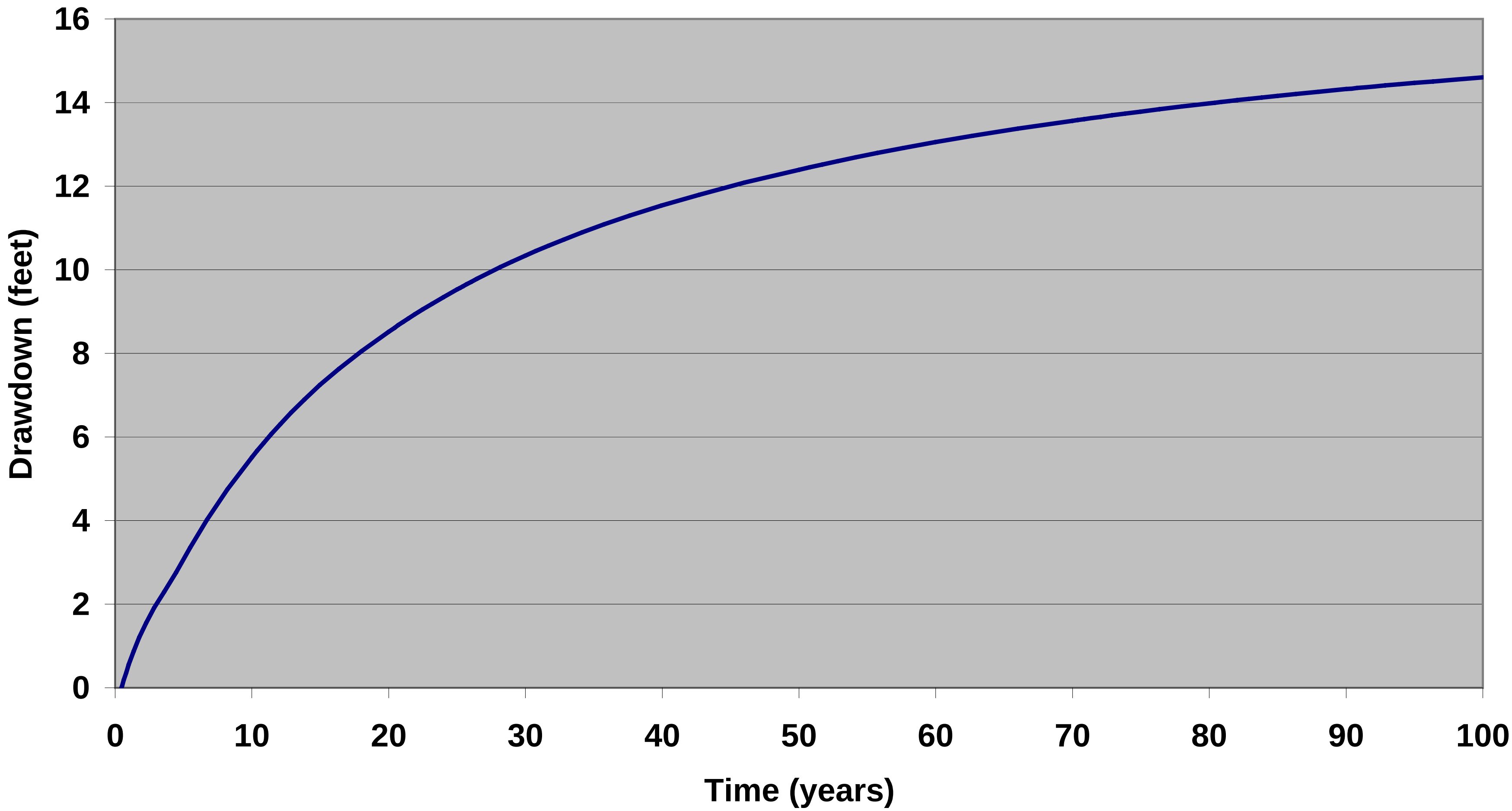


FIGURE C-2
Computed Drawdown at Headquarters Well #120
Fish Springs Ranch Area, Eastern Honey Lake Valley



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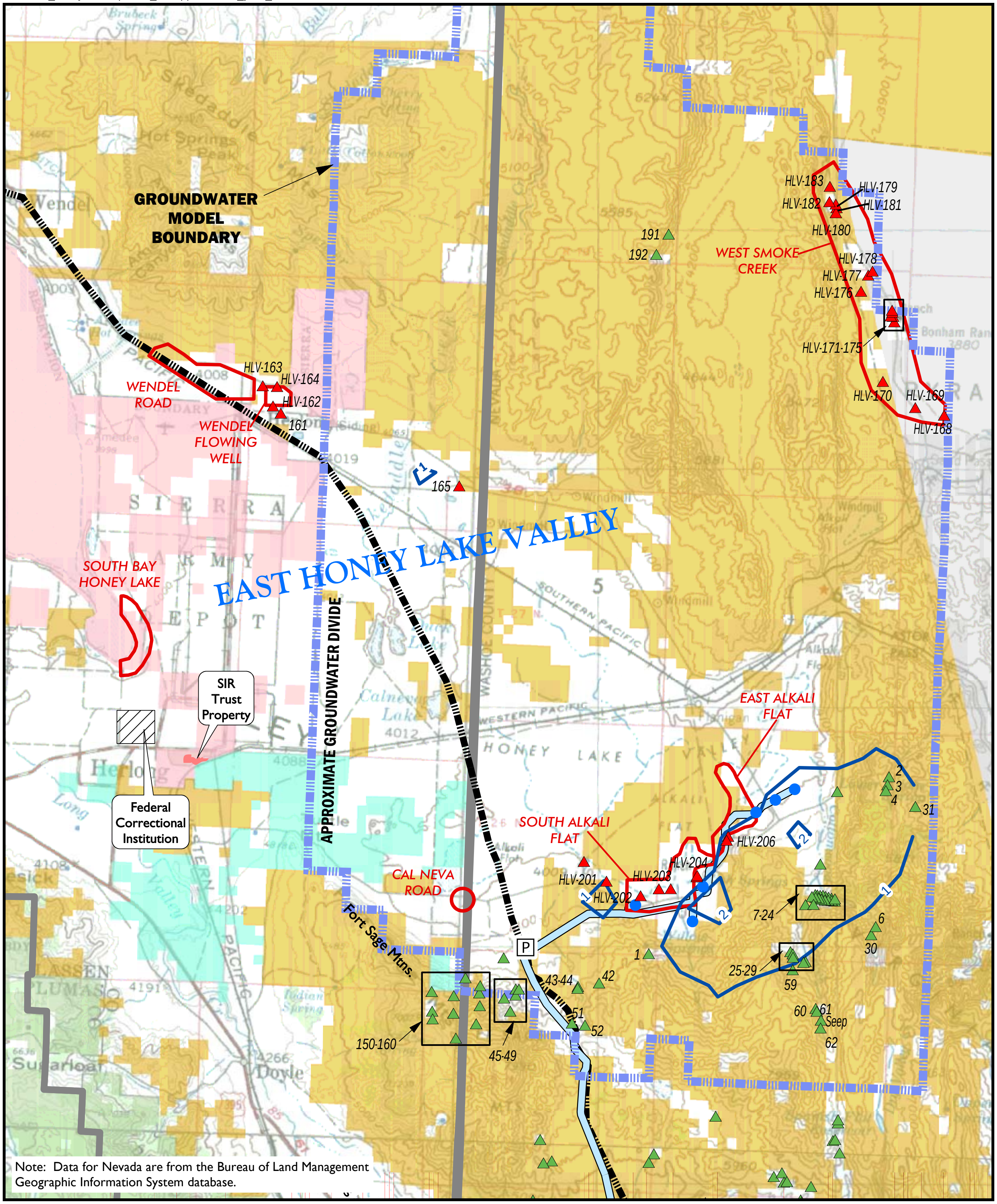

0 Miles 4

P Proposed Pump Station
Proposed Pumping Wells
Proposed Pipeline Route
Tuscarora Natural Gas Pipeline
Spring or Seep > 4100 ft. Elev.
Spring or Seep < 4100 ft. Elev.
Contour of Predicted 1-Year Drawdown (feet) In Layer 1 After Pumping 8,000 acre-feet/yr

Public Ownership
Bureau of Indian Affairs
Bureau of Land Management
Department of Defense
Forest Service
State of California
Susanville Indian Ranchera (SIR)
Potential Habitat for Carson Wandering Skipper

1-Year Groundwater Drawdown
Predicted in East Honey Lake Valley
North Valleys Rights-of-Way
Projects EIS
Washoe County, Nevada
FIGURE C-3

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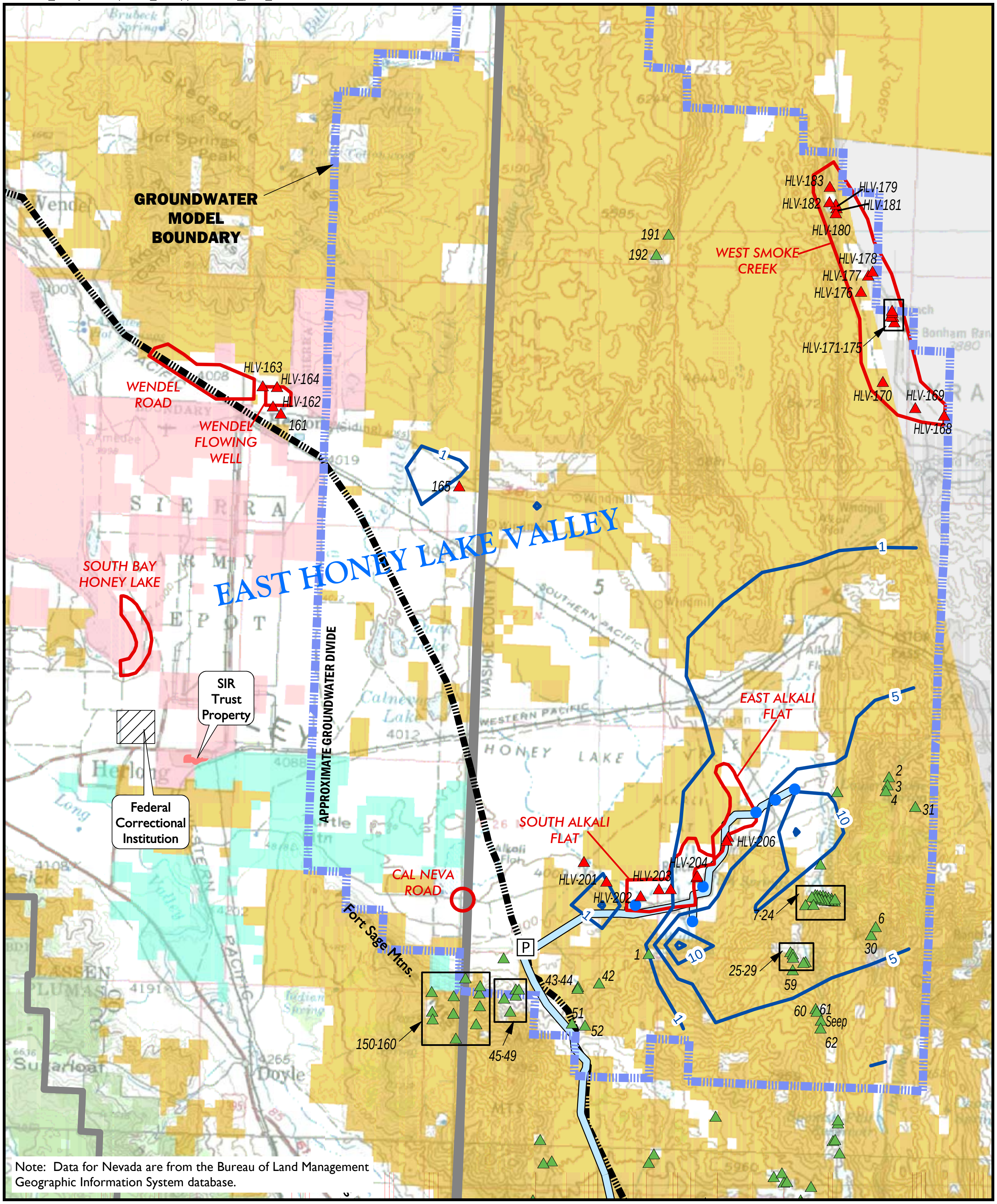

0 Miles 4

P Proposed Pump Station
Proposed Pumping Wells
Proposed Pipeline Route
Tuscarora Natural Gas Pipeline
Spring or Seep > 4100 ft. Elev.
Spring or Seep < 4100 ft. Elev.
Contour of Predicted 10-Year Drawdown (feet) In Layer 1 After Pumping 8,000 acre-feet/yr

Public Ownership
Bureau of Indian Affairs
Bureau of Land Management
Department of Defense
Forest Service
State of California
Susanville Indian Ranchera (SIR)
Potential Habitat for Carson Wandering Skipper

10-Year Groundwater Drawdown
Predicted in East Honey Lake Valley
North Valleys Rights-of-Way
Projects EIS
Washoe County, Nevada
FIGURE C-4

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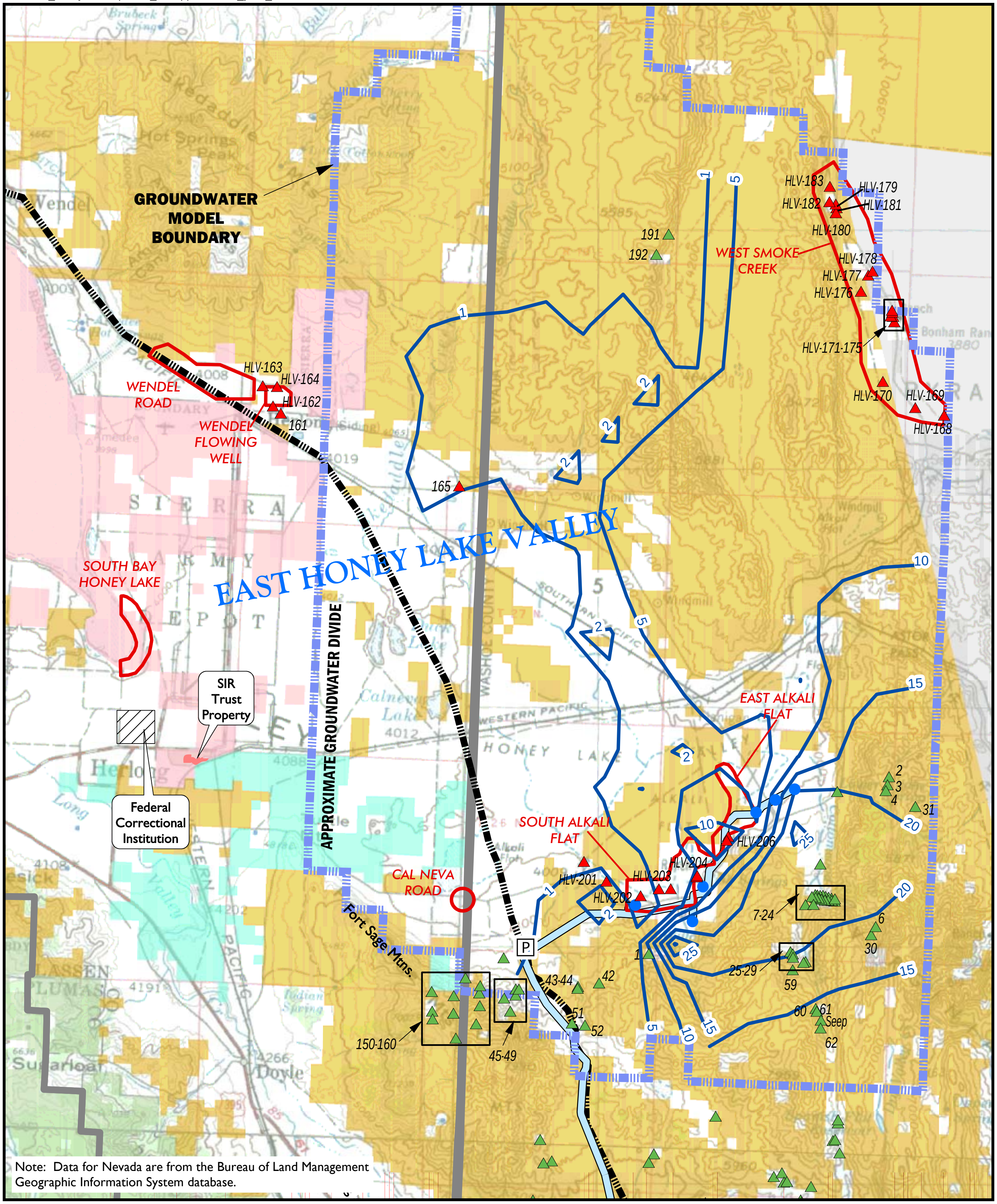
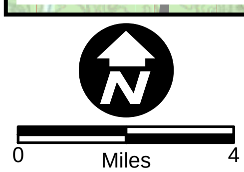




P Proposed Pump Station
Proposed Pumping Wells
Proposed Pipeline Route
Tuscarora Natural Gas Pipeline
Spring or Seep > 4100 ft. Elev.
Spring or Seep < 4100 ft. Elev.
Contour of Predicted 100-Year Drawdown (feet) In Layer 1 After Pumping 8,000 acre-feet/yr

Public Ownership
Bureau of Indian Affairs
Bureau of Land Management
Department of Defense
Forest Service
State of California
Susanville Indian Ranchera (SIR)
Potential Habitat for Carson Wandering Skipper

100-Year Groundwater Drawdown
Predicted in East Honey Lake Valley
North Valleys Rights-of-Way
Projects EIS
Washoe County, Nevada
FIGURE C-5

TABLE C-3 Hydrologic Budget for Groundwater Flow Model at Dry Valley				
Budget Components	Estimated Quantity (acre-feet per year)			
	Baseline Conditions	Proposed Action Conditions at 2,000 af/yr Pumping (10 years)	Proposed Action Conditions at 2,000 af/yr Pumping (100 years)	Proposed Action Conditions at 2,000 af/yr Pumping (steady-state)
RECHARGE				
Release from Storage	0	1,388	380	0
Groundwater Inflow from Layer 3 Fault Zone	494	494	494	494
Groundwater Inflow to Layer 4 from Upgradient	129	129	129	129
Recharge from Precipitation in Mountains	621	621	621	621
Recharge from Upper Valley Streambed	47	47	47	47
Recharge from Lower Valley Streambed	70	123	0	0
Groundwater Inflow across State Line	0	0	334	712
TOTAL RECHARGE	1,362	2,802	2,004	2,004
DISCHARGE				
Groundwater Taken Into Storage	0	1	1	0
Withdrawal from Production Wells	0	2,004	2,004	2,004
Groundwater Outflow to Stream	314	123	0	0
Evapotranspiration	517	227	0	0
Groundwater Outflow across State Line	531	461	0	0
TOTAL DISCHARGE	1,362	2,814	2,004	2,004

Source: InterFlow Hydrology 2005 and Groundwater Model Output Files.

Results of this model were used to represent baseline groundwater elevations in the basin. Subsequently, additional Well Package cells were added to the model to simulate pumping from five wells located in west-central Dry Valley at a combined rate of 2,000 af/yr (Proposed Action). Distribution of pumping rates in the model from the five production wells in Dry Valley is summarized in **Table C-4**.

A major fault zone that extends through the eastern portion of Dry Valley – Walker-Lane Shear Zone, including the Warm Springs Fault Zone – is outside the model boundary. To the extent that groundwater outflow exists through this structural zone to Honey Lake Valley, Warm Springs Valley, and/or Winnemucca Valley, it is assumed to be beyond the capture zone of proposed pumping in western Dry Valley.

TABLE C-4 Proposed Pumping Rates in Dry Valley		
Simulation Production Well	Model Layer	Simulated Pumping Rate (af/yr)
DVM-1	3	340
DVM-2	4	370
DVM-3	4	370
DVM-4	3	380
DVM-5	3	540
TOTAL	---	2,000

Source: Interflow Hydrology 2005b
Note: See **Figure 3-5** for locations of wells.

Interflow Hydrology (2005a, 2005b) calibrated the groundwater flow model to steady-state conditions using depth to groundwater measurements at 10 wells/piezometers in Dry Valley. Results of the calibration process showed a mean residual of 0.09 foot, an absolute mean residual of 6.87 feet, a residual standard deviation of 6.87 feet, and a residual standard deviation to head range ratio of 0.05 (Interflow Hydrology 2005b). Most simulated water elevations were within 10 feet of observed elevations (Interflow Hydrology 2005b). Calibration was not performed for transient conditions as there were insufficient data to match for actual field conditions.

Interflow Hydrology (2005a) performed a sensitivity analysis on the previous version of the model used in the Draft EIS to evaluate its sensitivity to varying parameters used in the model. The model is most sensitive to changes in storage coefficient of the aquifer, with moderate sensitivity to varying hydraulic conductivity, general head boundary conductance, recharge, and evapotranspiration. The conclusion is that altering any of the variables by 20 percent, other than storage coefficient, would not produce significantly differing simulation results (Interflow Hydrology 2005a).

The groundwater model was used to simulate pumping from five wells in west-central Dry Valley at a combined rate of 2,000 af/yr (Proposed Action). Comparing the baseline and pumping condition water budgets in **Table C-3** indicates that pumping 2,000 af/yr is predicted to eventually completely eliminate evapotranspiration (517 af/yr) and groundwater outflow to Long Valley (531 af/yr) in the model area. In addition, a groundwater flux from Long Valley back into Dry Valley is induced at 334 af/yr by year 100, and 712 af/yr eventually for steady-state conditions.

It is possible that pumping from Dry Valley at 2,000 af/yr could eventually reduce any groundwater outflow occurring from upper Dry Valley to Warm Springs Valley (including Winnemucca Valley) via the Walker Lane fault zone. This area is outside of the model domain; however, the groundwater drawdown zone of influence could eventually extend into upper Dry Valley. InterFlow Hydrology (2005a) and the USGS (Berger *et al.* 2004) believe that hypothetical groundwater outflow along the Walker Lane fault zone northwest to Honey Lake Valley is not supported by the occurrence of springs along the fault zone. Deep geothermal groundwater inflow to Dry Valley is simulated in the model for baseline and pumping conditions.

The model predicts that groundwater drawdown at the state-line due to pumping of 2,000 af/yr would be 60 to 70 feet after 100 years, and would eventually be 80 to 105 feet at steady-state conditions (**Figure 4-2**). Drawdown at the pumping wells eventually would be up to about 430 feet. Drawdown is calculated by subtracting groundwater surface elevations developed using the baseline model from elevations developed for pumping under the Proposed Action. According to InterFlow Hydrology (2005a), approximately 85 percent of reductions in water levels, subsurface outflow, and evapotranspiration in the pumping center are achieved after 100 years of pumping.

Figures C-6 and **C-7** are hydrographs of groundwater drawdown versus time (0 to 100 years) developed using InterFlow Hydrology's 2005 model for two wells near the state line: Well No. 16 (USGS) and Well No. 17 (Lenz domestic well) (see **Figure 3-5** for well locations). Both wells show predicted drawdown of 2 to 7 feet at year 10, and about 60 to 70 feet at year 100. **Figures C-8, C-9,** and **C-10** show distribution of groundwater drawdown in Layer 3 throughout western Dry Valley in plan view for 1, 10, and 100 years, respectively, after initiation of pumping 2,000 af/yr. Model results indicated that pumping 2,000 af/yr would eventually result in complete dewatering of the alluvial groundwater system (Layer 1) beneath the eastern-most portion of the model domain. Some of the Tertiary-age sediments in the eastern portion of the model domain (Layers 2 and 3) also would be dewatered.

BEDELL FLAT GROUNDWATER FLOW MODEL

Interflow Hydrology (2004) developed a 2-dimensioanl groundwater flow model using MODLFLOW to simulate pumping groundwater from existing well BF-2 at a rate of 500 af/yr. Well BF-2 is 12 inches in diameter, 400 feet deep, and is located in the northwest potion of Bedell Flat (**Figure 3-5**). The model domain encompasses most of the Bedell Flat hydrographic area, including the mountain blocks surrounding the valley floor (**Figure 4-3**). The model grid has a uniform spacing of 1,000 feet.

Layer 1represents the active groundwater flow system comprised primarily of unconsolidated basin fill deposits. Layer 1 also includes fractured volcanic bedrock in the southern part of the model domain and at four locations of subsurface outflow from the basin. The top of Layer 1 represents ground surface, and the bottom of Layer 1 is the surface of low permeability granite bedrock. Layer 1 is MODFLOW Type 3 (convertible confined/unconfined).

The following boundary conditions were used in the Bedell Flat model:

- No-flow boundaries to represent the valley margin.
- General Head (head dependent flux) Boundary cells to represent groundwater outflow to Red Rock, Antelope and Warm Springs valleys.
- Recharge Package cells to simulate recharge from infiltrating precipitation and runoff from Dogskin Mountain, Fred's Mountain and Sand Hills.
- Evapotranspiration Package cells to simulate spring discharge and evapotranspiration due to phreatophytes in the northwest corner of the model domain.

Hydraulic conductivity values for Layer 1 were distributed and refined during model calibration and range from 0.03 to 5.3 ft/day (Interflow Hydrology 2004). Hydraulic conductivity assigned to the two pumping well locations is 1.0 ft/day, consistent with aquifer test data for this part of the basin.

The model was calibrated to steady-state conditions to match measured and estimated water levels at eight wells in Bedell Flat. Bedell Flat is assumed to be in equilibrium conditions (i.e., water in equals water out of the basin). Groundwater levels were measured at eight well locations throughout Bedell Flat, which were used as the model calibration targets. Results of the calibration process showed a mean residual of 2.3 feet, an absolute residual mean of 7.47 feet, a residual standard deviation of 8.9 feet, and a residual standard deviation to head range ratio of 0.01 (Interflow Hydrology 2004). Calibration was not performed for transient conditions as there were insufficient data to match for actual field conditions.

Results of this model were used to represent baseline groundwater elevations in the basin. Subsequently, the model was modified to simulate pumping well BF-2 located in the northwest side of Bedell Flat at a rate of 500 af/yr (Proposed Action). Even though the Proposed Action specifies the use of two production wells in Bedell Flat (BF-1 and BF-2), the model simulation is reasonable using one pumping well because the two wells are located in close proximity to each other (**Figure 4-3**).

A sensitivity analysis was performed by Interflow Hydrology (2004) to evaluate the sensitivity of the model to varying parameters used in the model. The model is least sensitive to changes in evapotranspiration and storage coefficient, with moderate sensitivity to varying recharge and hydraulic conductivity. The model is subject to numeric instability (i.e., inability of modeling code to arrive at a solution) if even moderate changes to the general head boundaries are imposed (Interflow Hydrology 2004b).

Hydrologic budgets used in the baseline model and pumping simulation for Bedell Flat are presented in **Table C-5**. For baseline conditions, the model assumes approximately 1,300 af/yr of total groundwater recharge from precipitation based on results of the Maxey-Eakin and chloride-balance estimating techniques previously applied to Bedell Flat (Rush and Glancy 1967; InterFlow Hydrology and Cordilleran Hydrology 2003). Recharge is distributed to the model at the valley floor margins adjacent to the three major mountain blocks that bound the watershed: Dogskin Mountain along the north edge of the basin adds 75 percent of total recharge, Freds Mountain along the south edge adds 14 percent, and Sand Hills along the west edge adds 11 percent of total recharge. Additional recharge would occur from groundwater released from storage after initiation of pumping (446 af/yr by year 10, and 174 af/yr at 100 years).

For the baseline model, groundwater is discharged as evapotranspiration and subsurface outflow. Subsurface outflow through unconsolidated fill and fractured bedrock occurs from the northwest side of the basin to Red Rock Valley located at the northwest margin of Bedell Flat near the boundary with Red Rock Valley (**Figure 4-3**). For baseline conditions, the groundwater model incorporates groundwater flow of 450 af/yr from Bedell Flat into Red Rock Valley.

FIGURE C-6
Computed Drawdown at Well #16 (USGS) in Dry Valley near State-Line

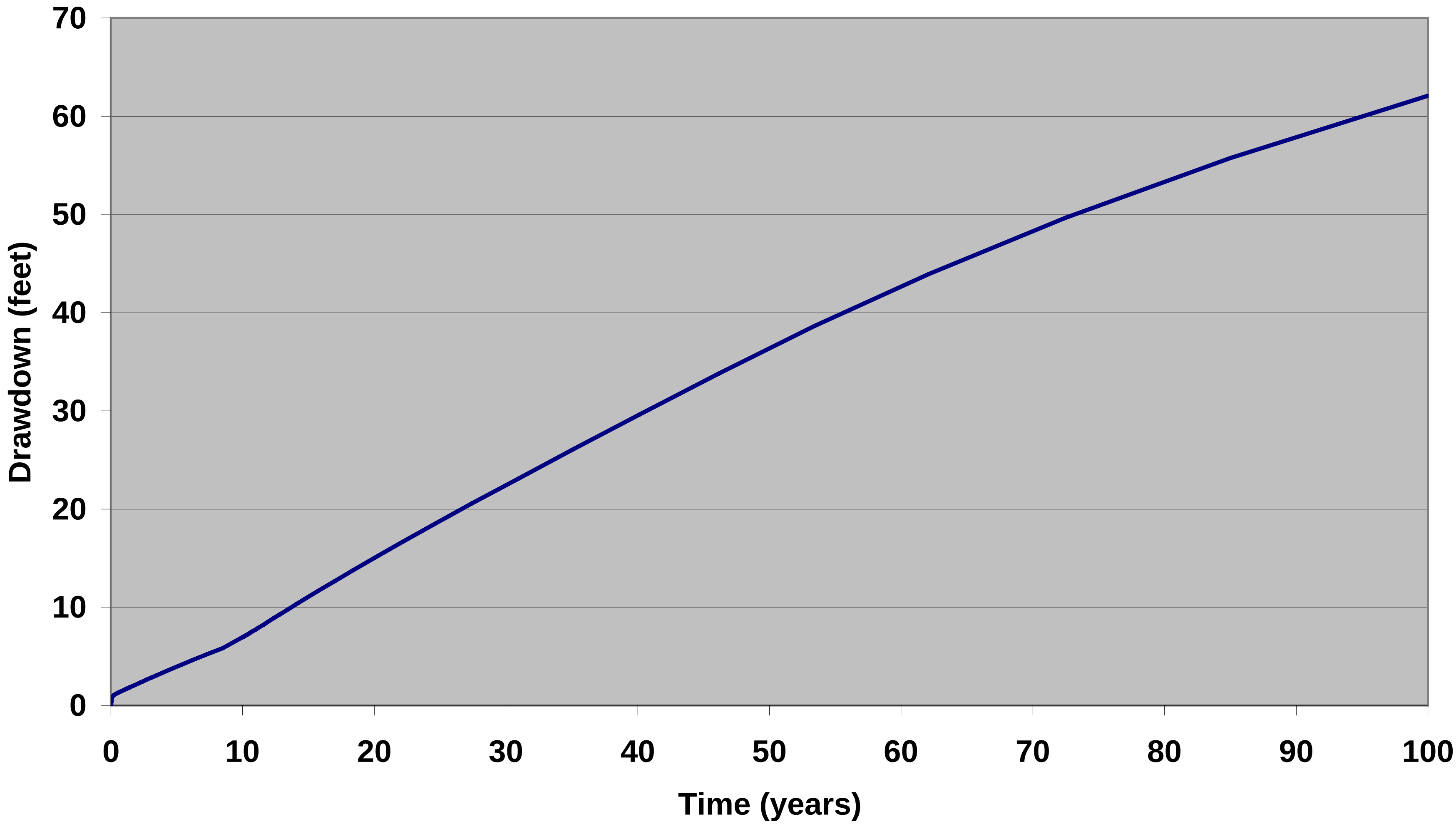
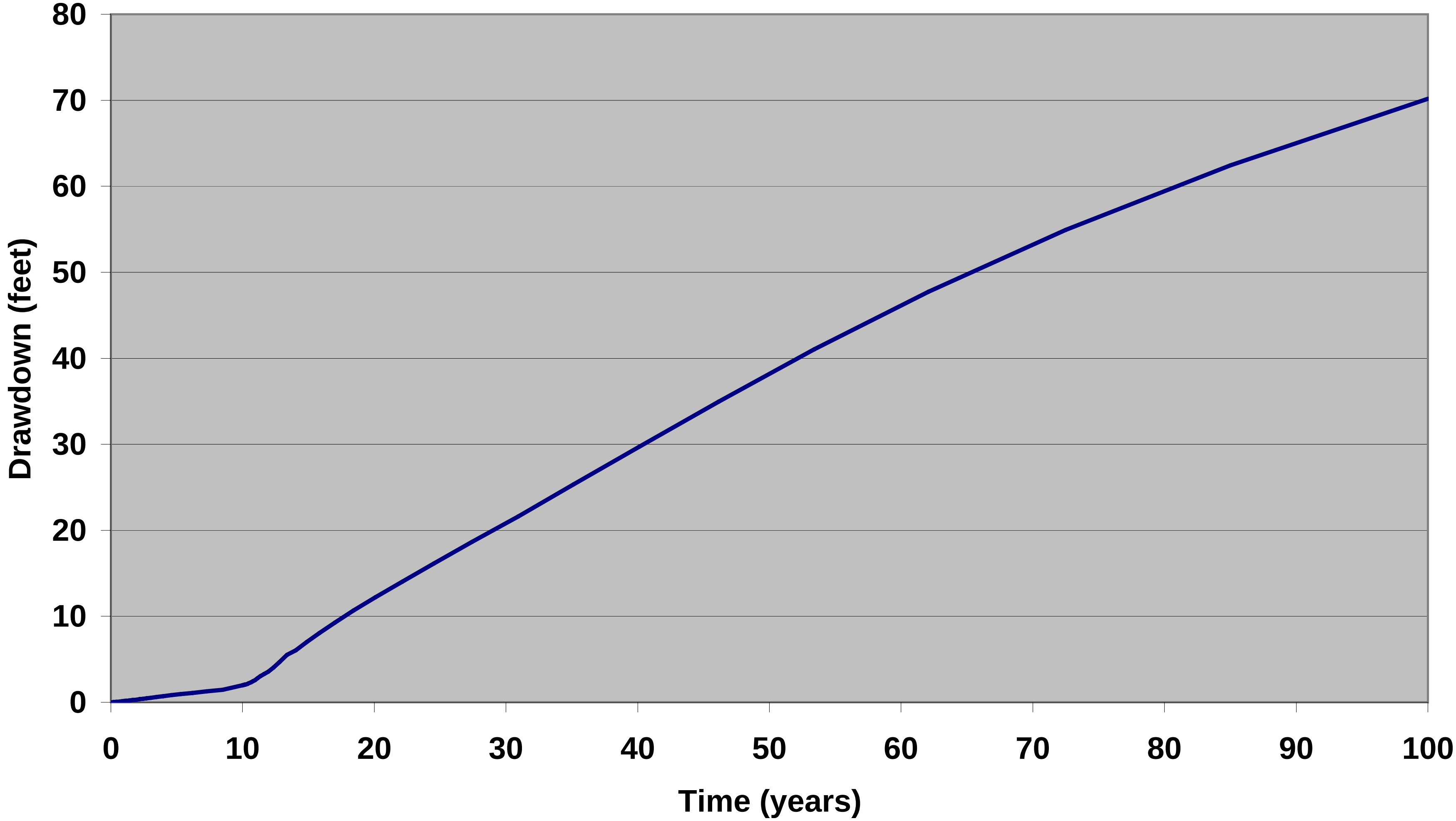


FIGURE C-7
Computed Drawdown at Lenz Domestic Well #17 in Dry Valley



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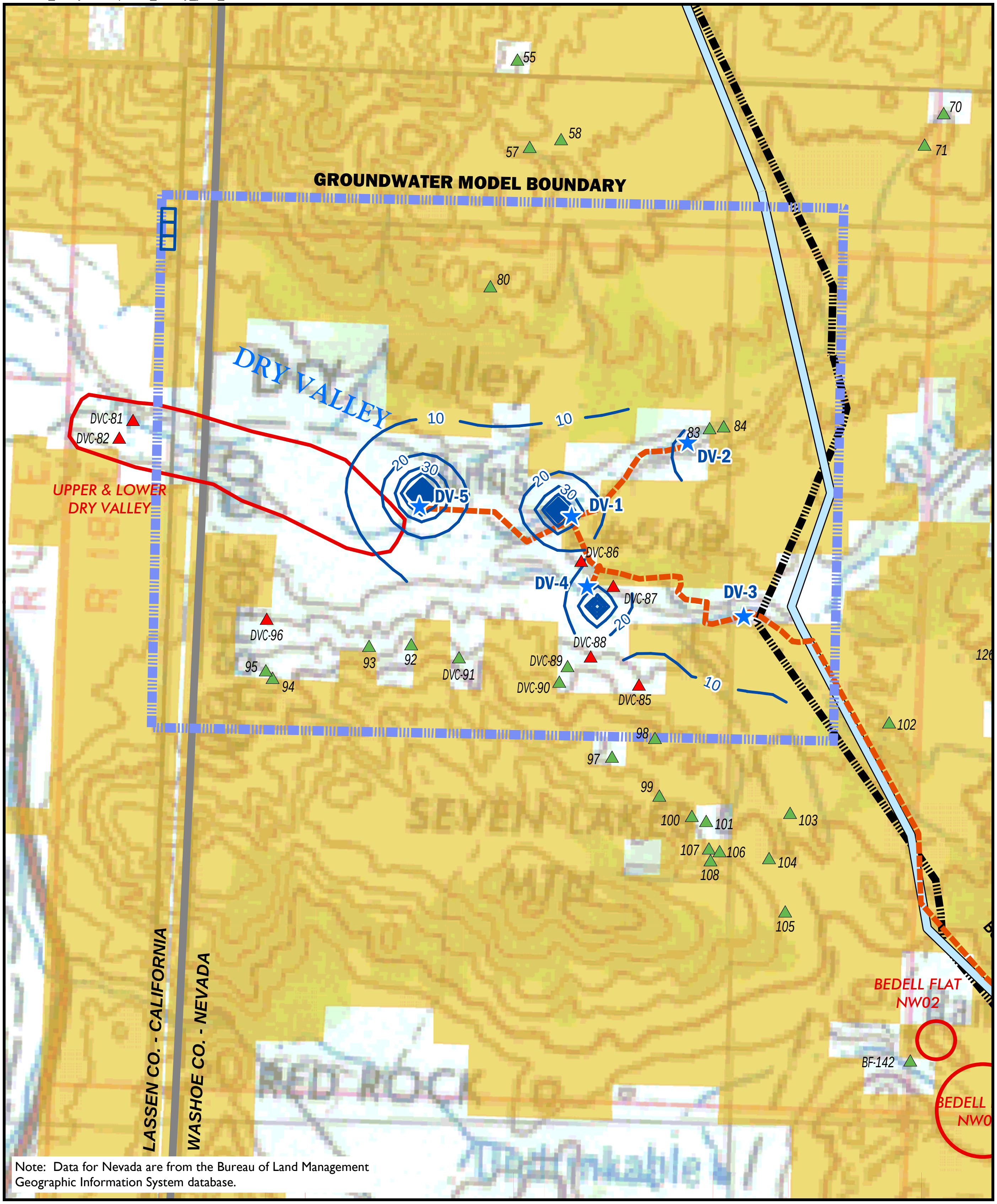

0 Miles 1

P Proposed Pump Station
Proposed Pumping Wells
Proposed Pipeline Route
Proposed Pipeline Route
Tuscarora Natural Gas Pipeline
Contour of Predicted 1-Year Drawdown (feet) In Layer 3 After Pumping 2,000 acre-feet/yr
Spring or Seep >4600 ft. Elev.
Spring or Seep <4600 ft. Elev.
Public Ownership
Bureau of Land Management
1yr dd.dwg Polyline
Potential Habitat for Carson Wandering Skipper

1-Year Groundwater Drawdown Predicted in Dry Valley
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE C-8

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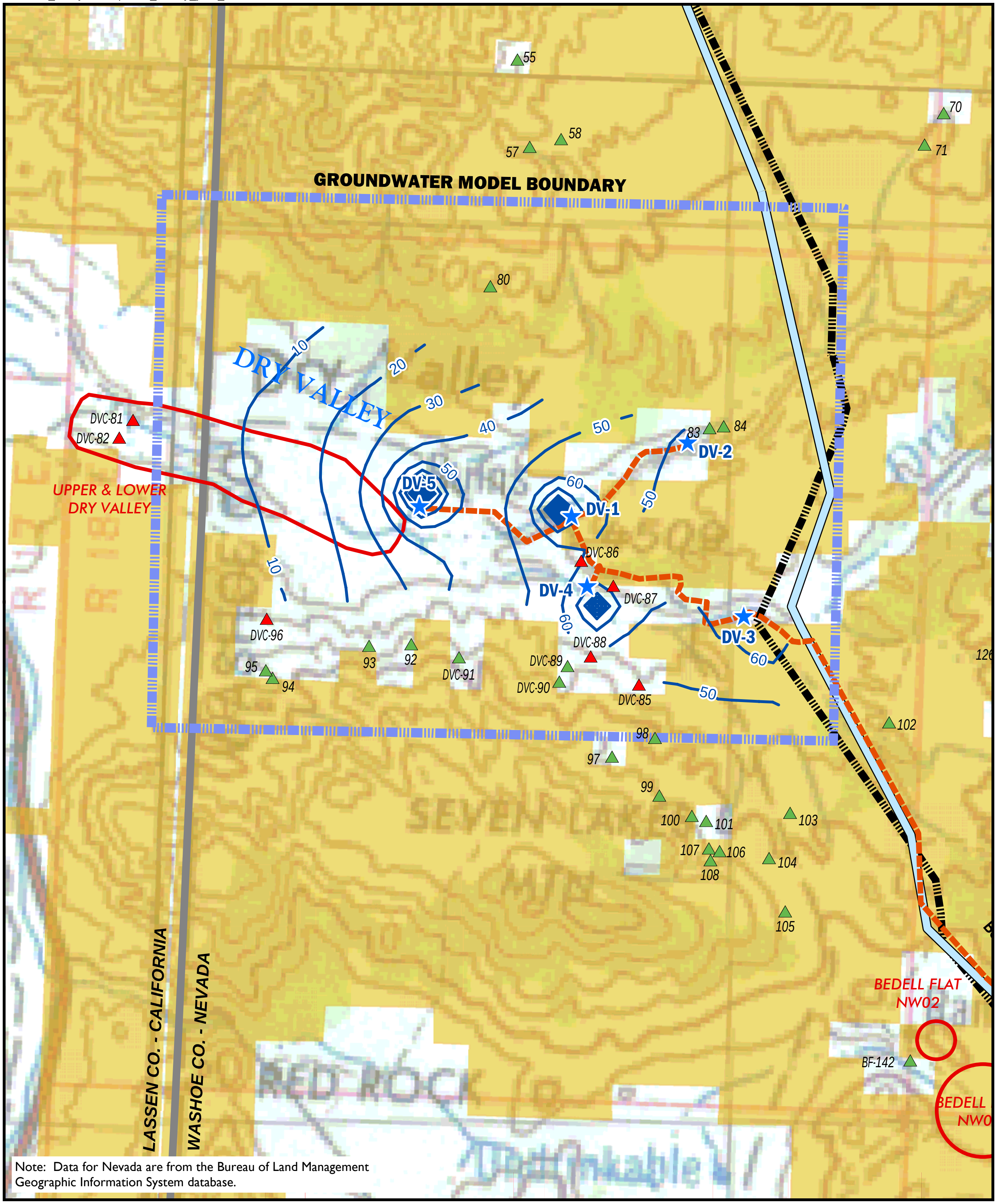

0 Miles 1

- P Proposed Pump Station
- Proposed Pumping Wells
- Proposed Pipeline Route
- Proposed Pipeline Route
- Tuscarora Natural Gas Pipeline
- Contour of Predicted 10-Year Drawdown (feet) In Layer 3 After Pumping 2,000 acre-feet/yr
- Spring or Seep >4600 ft. Elev.
- Spring or Seep <4600 ft. Elev.

Public Ownership

- Bureau of Land Management
- 10yr dd.dwg Polyline
- Potential Habitat for Carson Wandering Skipper

10-Year Groundwater Drawdown
Predicted in Dry Valley
North Valleys Rights-of-Way
Projects EIS
Washoe County, Nevada
FIGURE C-9

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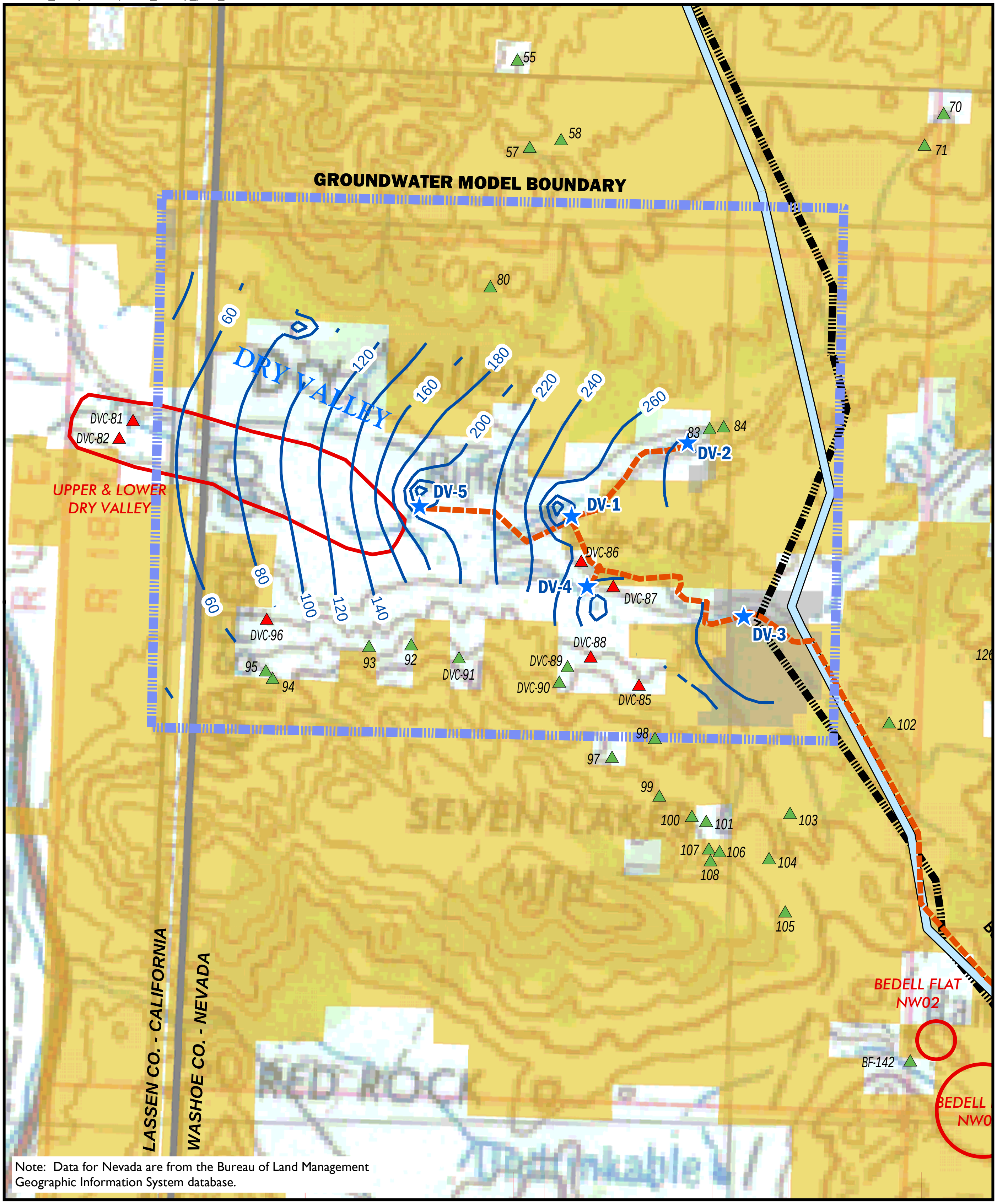


Miles 0 1

P Proposed Pump Station
Proposed Pumping Wells
Proposed Pipeline Route
Proposed Pipeline Route
Tuscarora Natural Gas Pipeline

100 Contour of Predicted 100-Year Drawdown (feet) In Layer 3 After Pumping 2,000 acre-feet/yr

Spring or Seep >4600 ft. Elev.
Spring or Seep <4600 ft. Elev.
Public Ownership
Bureau of Land Management
100yr dd.dwg Polyline
100yr dd.dwg Polygon
Potential Habitat for Carson Wandering Skipper
Area of Complete Aquifer Dewatering In Layer 3

100-Year Groundwater Drawdown
Predicted in Dry Valley
North Valleys Rights-of-Way
Projects EIS
Washoe County, Nevada
FIGURE C-10

TABLE C-5 Hydrologic Budget for Groundwater Flow Model at Bedell Flat				
Budget Components	Estimated Quantity (acre-feet per year)			
	Baseline Conditions	Proposed Action Conditions at 500 af/yr Pumping (10 years)	Proposed Action Conditions at 500 af/yr Pumping (100 years)	Proposed Action Conditions at 500 af/yr Pumping (steady-state)
RECHARGE				
Release from Storage	0	446	174	0
Recharge from Precipitation	1,306	1,306	1,306	1,306
Groundwater Inflow	0	0	0	0
TOTAL RECHARGE	1,306	1,752	1,480	1,306
DISCHARGE				
Groundwater Evapotranspiration	73	66	38	29
Groundwater Outflow to Red Rock Valley	450	402	211	155
Groundwater Outflow to Warm Springs Valley	782	782	729	621
Withdrawal from Wells	0	501	501	501
TOTAL DISCHARGE	1,305	1,751	1,479	1,306

Source: InterFlow Hydrology 2004a and Groundwater Model Output Files.

Subsurface outflow through fractured bedrock is modeled from the east side of the basin to Warm Springs Valley and Antelope Valley, although modeled flow to Antelope Valley is negligible. For baseline conditions, the groundwater model incorporates groundwater flow of 782 af/yr from Bedell Flat into Warm Springs Valley.

To simulate groundwater conditions that develop under the Proposed Action, pumping of well BF-2 in the northwest side of Bedell Flat at a rate of 500 af/yr is used as a groundwater discharge component, in addition to evapotranspiration and subsurface outflow. The water budgets show that total recharge and discharge rates are similar between the baseline condition and ultimate steady-state conditions for the Proposed Action, with recharge/discharge increasing during the first 100 years of pumping due to release of groundwater from storage (**Table C-5**).

All evapotranspiration in the model occurs in a wetland area surrounding Campbell Spring located at the northwest margin of Bedell Flat at the boundary with Red Rock Valley (**Figure 4-3**). Discharge from the spring is included in the evapotranspiration budget in **Table C-5**. The evapotranspiration rate and extinction depth (50 feet) used in the model produce 73 af/yr of discharge at the Campbell Spring area for baseline conditions. This evapotranspiration rate declines to 66 af/yr in year 10, 38 af/yr in year 100, and 29 af/yr for steady-state conditions.

Total discharge from the basin is assumed to equal recharge. As a result, under baseline conditions, combined total discharge via groundwater outflow is the remainder of available recharge, or 1,232 af/yr (450 af/yr to Red Rock Valley and 782 af/yr to Warm Springs Valley; **Table C-5**). For final steady-state conditions, total subsurface outflow through the model area is predicted to decrease by 456 af/yr (from 1,232 to 776 af/yr; **Table C-5**) due to the proposed pumping of 500 af/yr in Bedell Flat. Of this amount, about 300 af/yr of groundwater flow reduction would occur to Red Rock Valley. This is about 67 percent of estimated natural groundwater flow from Bedell Flat to Red Rock Valley, and about 33 percent of natural groundwater recharge to Red Rock Valley estimated by the USGS. The predicted amount of groundwater flow reduction to Warm Springs Valley of about 160 af/yr resulting from proposed pumping in Bedell Flat is about 20 percent of estimated natural groundwater flow to Warm Springs Valley from Bedell Flat, and about 3 percent of natural groundwater recharge to Warm Springs Valley.

For the proposed pumping of 500 af/yr in Bedell Flat, predicted maximum steady-state groundwater drawdown would be 116 feet in the vicinity of pumping well BF-2, 28 feet at Campbell Spring, 35 feet at the BLM stockwater well located near the valley center, 32 feet at a domestic well at the east margin of the basin, and 9 feet at domestic wells along the southern margin of the basin (**Figure 4-3**). Drawdown is calculated by subtracting groundwater surface elevations developed using the baseline model from elevations developed for pumping under the Proposed Action. According to InterFlow Hydrology (2004b), 65 percent of reductions in water levels, subsurface outflow, and evapotranspiration are achieved after 100 years of pumping.

Figures C-11 and **C-12** present hydrographs of groundwater drawdown versus time (0 to 100 years) developed using InterFlow Hydrology's 2004 model for two wells in Bedell Flat -- BLM stockwater well and Etcheverry domestic well No. 16 (see **Figure 3-5** for well locations). The BLM stockwater well shows drawdown of about 0.2 feet in year 1, and 11.7 feet in year 100. Predicted drawdown of 0.01 foot or less occurs at the domestic wells in southern Bedell Flat at both 1 and 100 years. **Figures C-13, C-14** and **C-15** show the distribution of groundwater drawdown in Layer 1 throughout Bedell Flat in plan view for 1, 10, and 100 years, respectively, after initiation of pumping 500 af/yr.

FIGURE C-11
Computed Drawdown at BLM Stockwater Well in Bedell Flat

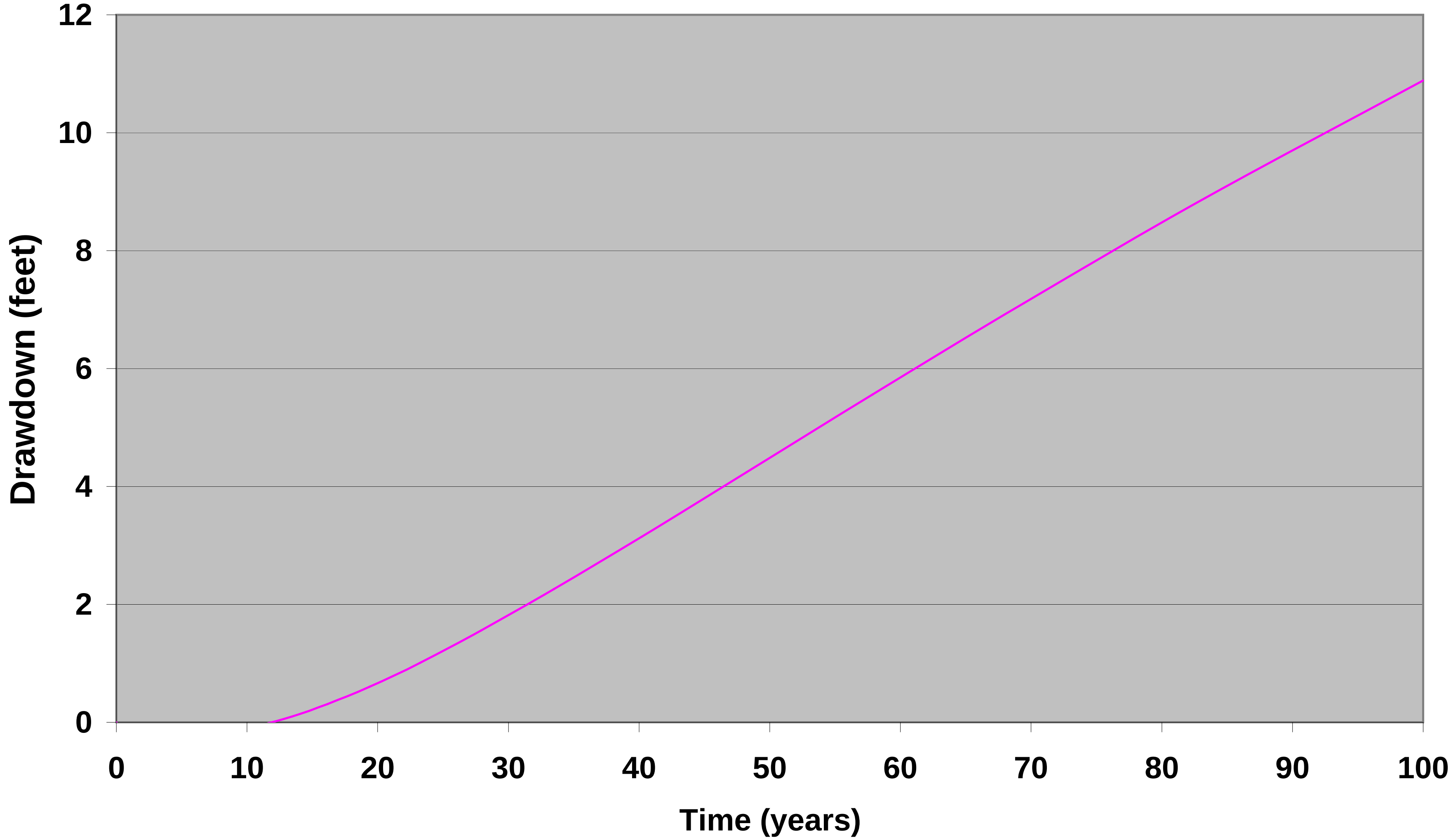
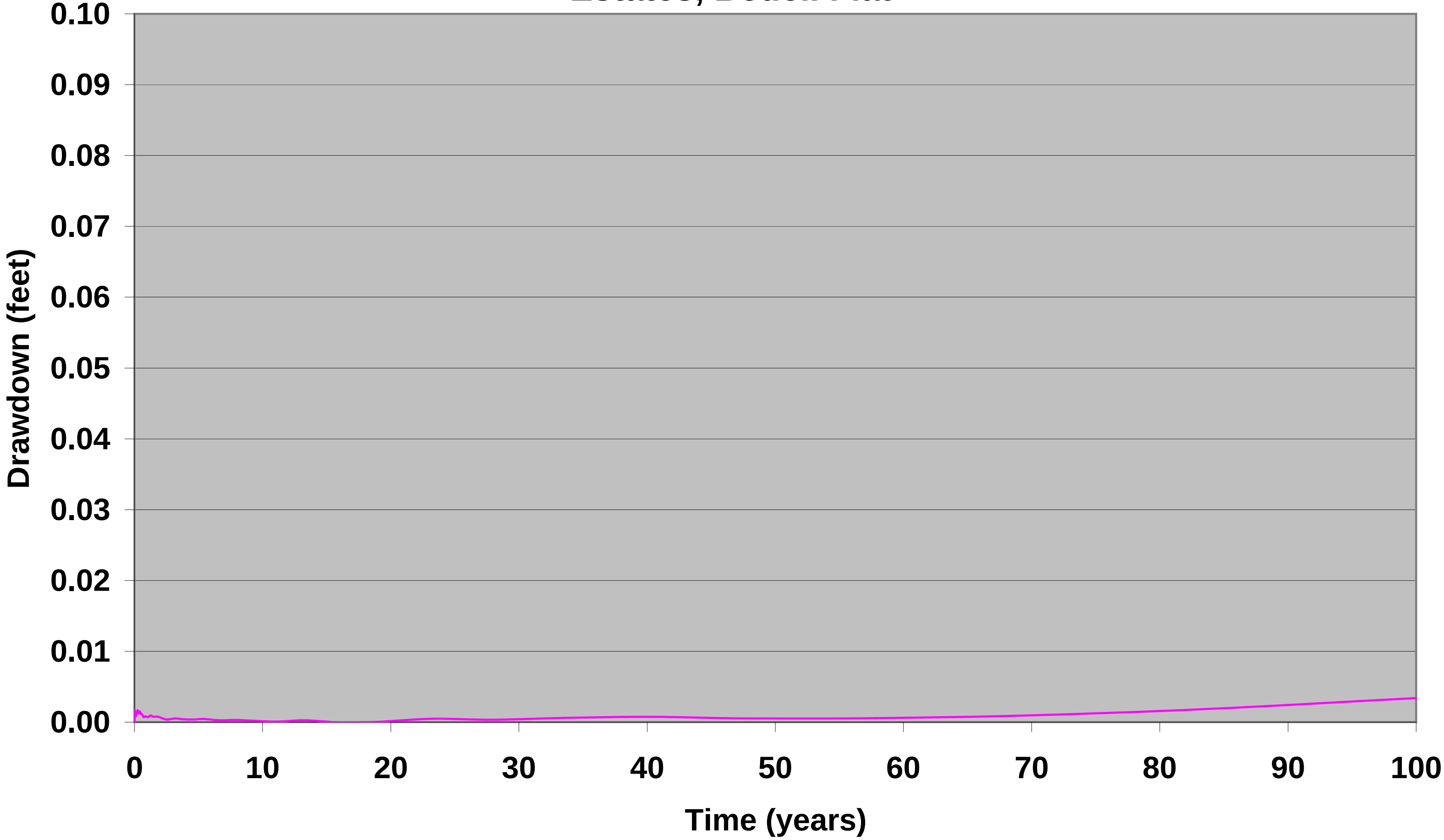


FIGURE C-12
Computed Drawdown at Etcheverry Domestic Well #16 in Red Rock Estates, Bedell Flat



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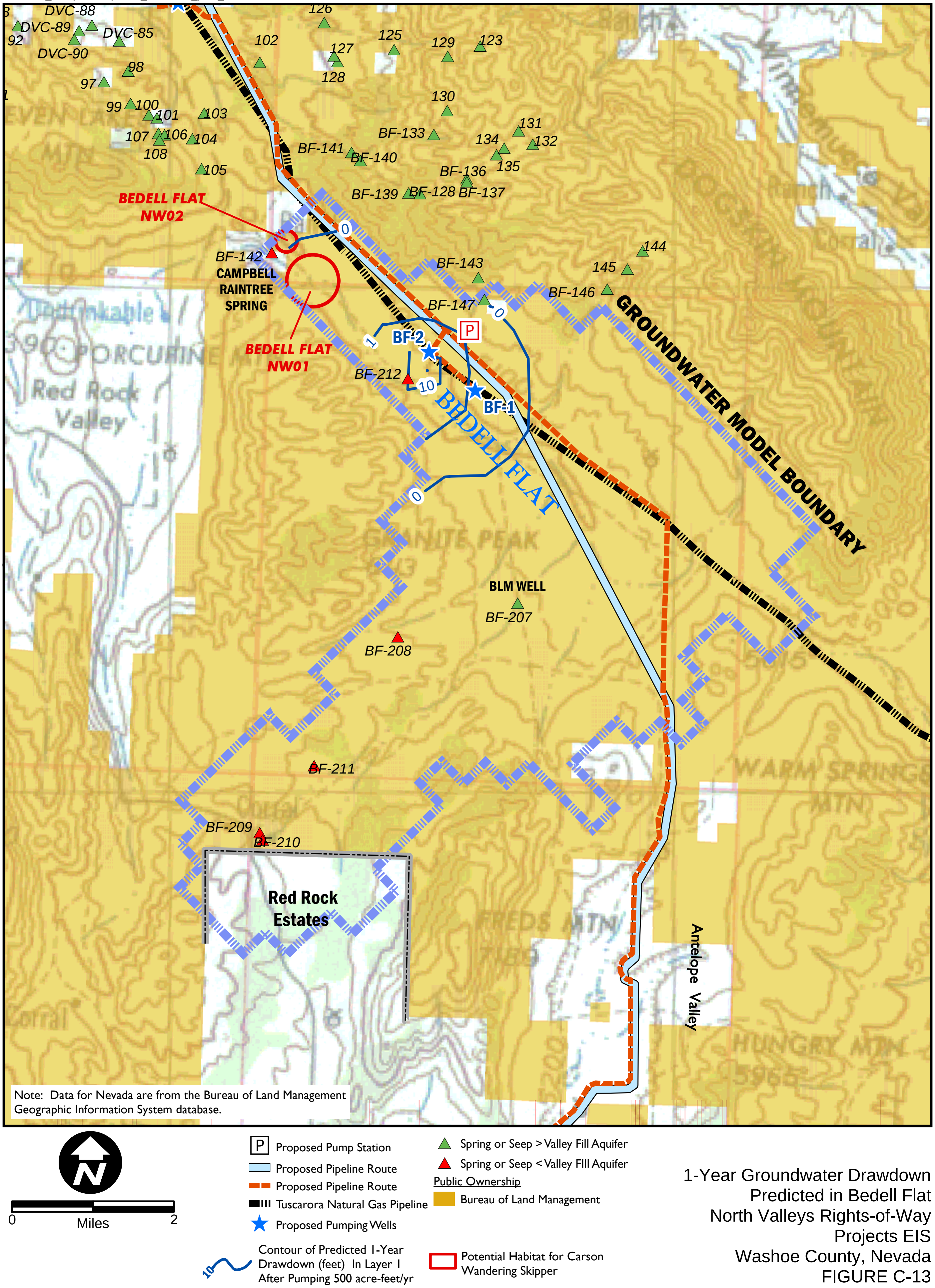

1-Year Groundwater Drawdown
Predicted in Bedell Flat
North Valleys Rights-of-Way
Projects EIS
Washoe County, Nevada
FIGURE C-13

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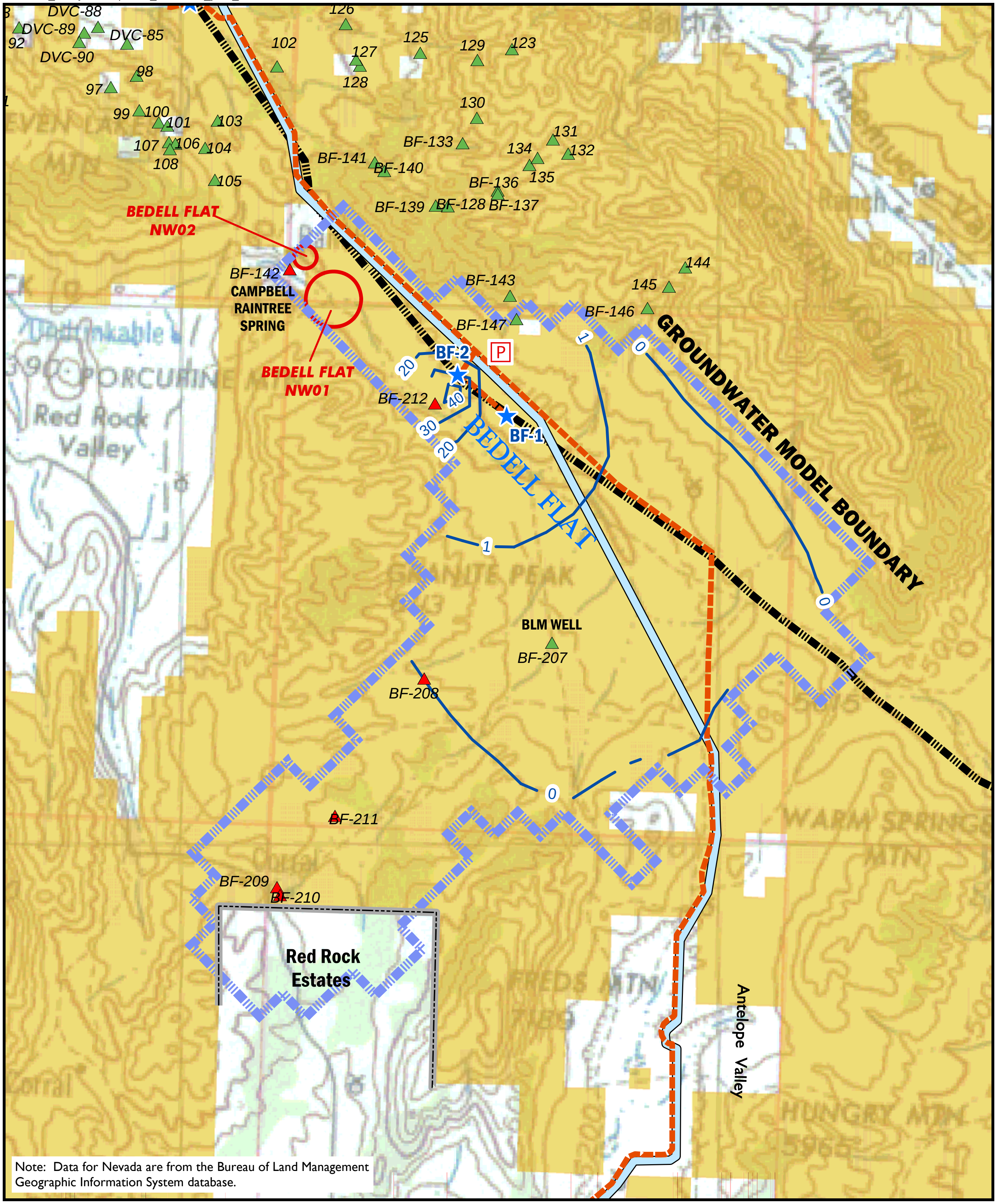

0 Miles 2

Proposed Pump Station
Proposed Pipeline Route
Proposed Pipeline Route
Tuscarora Natural Gas Pipeline
Proposed Pumping Wells
Contour of Predicted 10-Year Drawdown (feet) In Layer 1 After Pumping 500 acre-feet/yr
Spring or Seep > Valley Fill Aquifer
Spring or Seep < Valley FIll Aquifer
Public Ownership
Bureau of Land Management
Potential Habitat for Carson Wandering Skipper

10-Year Groundwater Drawdown Predicted in Bedell Flat
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE C-14

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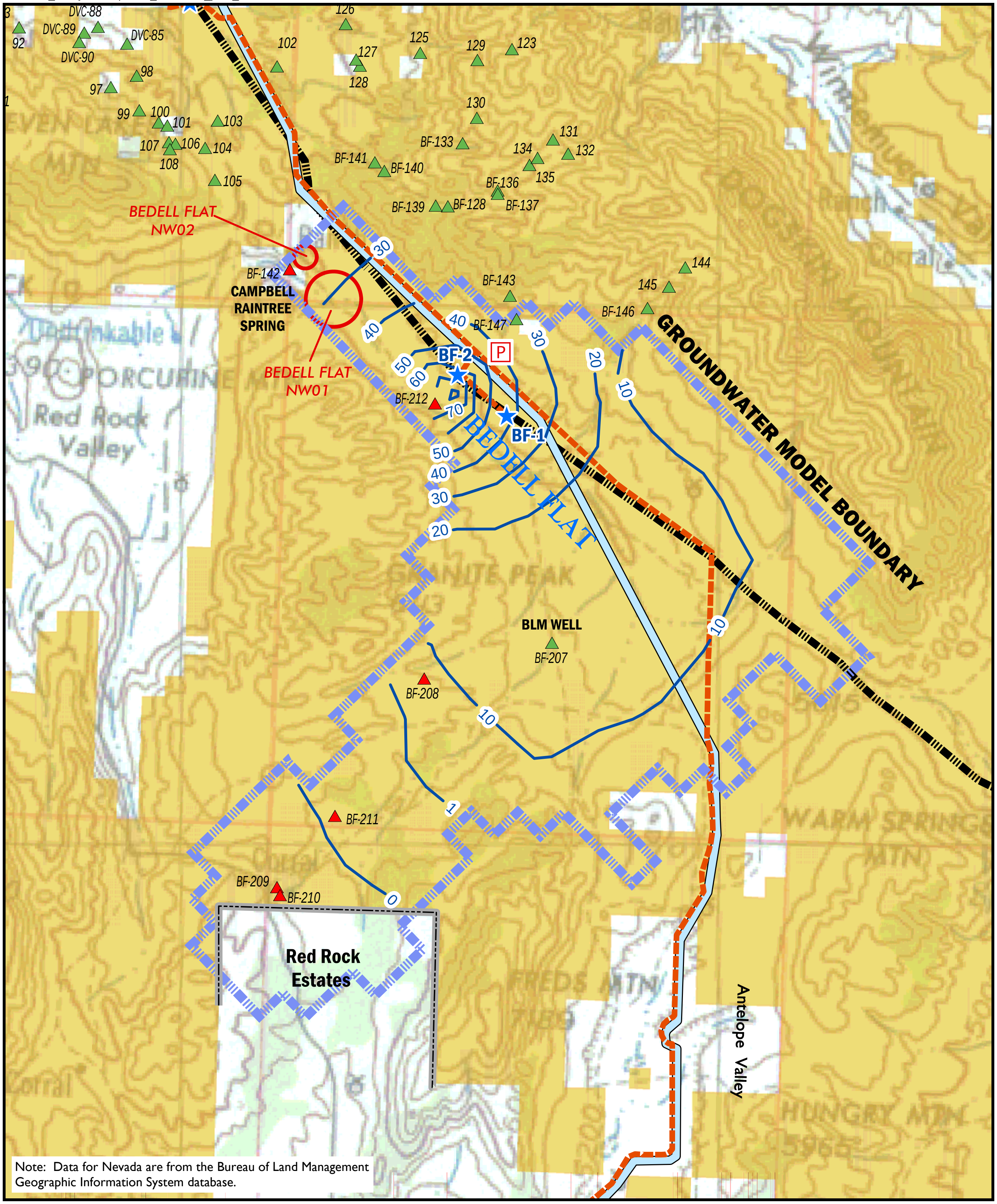

0 Miles 2

P Proposed Pump Station
Proposed Pipeline Route
Proposed Pipeline Route
Tuscarora Natural Gas Pipeline
Proposed Pumping Wells
Contour of Predicted 100-Year Drawdown (feet) In Layer 1 After Pumping 500 acre-feet/yr
Spring or Seep > Valley Fill Aquifer
Spring or Seep < Valley FIll Aquifer
Public Ownership
Bureau of Land Management
Potential Habitat for Carson Wandering Skipper

100-Year Groundwater Drawdown
Predicted in Bedell Flat
North Valleys Rights-of-Way
Projects EIS
Washoe County, Nevada
FIGURE C-15

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APPENDIX D

Recommended Water Resources Monitoring and Management Plan

APPENDIX D

RECOMMENDED WATER RESOURCES MONITORING AND MANAGEMENT PLAN

FOR FUTURE PUMPING IN HONEY LAKE VALLEY, DRY VALLEY, AND BEDELL FLAT, NEVADA NORTH VALLEYS RIGHTS-OF-WAY PROJECTS

(To be submitted to the Nevada State Engineer)

This Monitoring and Management Plan (**Plan**) describes monitoring and management activities of water resources and related potential impacts due to development of groundwater resources in eastern Honey Lake Valley, Dry Valley, and Bedell Flat associated with the proposed North Valleys Rights-of-Way Projects (**Projects**). This Plan applies to proposed groundwater extraction rates of up to 8,000 acre-feet per year (af/yr) in eastern Honey Lake Valley, 2,000 af/yr in Dry Valley, and 500 af/yr in Bedell Flat. Groundwater would be extracted from these valleys by Fish Springs Ranch and Intermountain Water Supply (**Proponents**) and conveyed via pipelines to the Stead/Lemmon Valley areas in Washoe County, Nevada, subject to water right appropriations from the Nevada State Engineer. This Plan covers both Proponents; however, additional site-specific proposed monitoring activities are presented in **Attachment A** (Honey Lake Valley), **Attachment B** (Dry Valley), and **Attachment C** (Bedell Flat).

Along with the U.S. Bureau of Land Management (BLM) as lead agency, the following groups are cooperating agencies for the North Valleys Rights-of-Way Projects EIS: U.S. Geological Survey (USGS); U.S. Fish and Wildlife Service (USFWS); U.S. Bureau of Indian Affairs (BIA); Pyramid Lake Paiute Tribe; Sierra Army Depot; California Department of Water Resources; California Department of Fish and Game; Washoe County, Nevada; Lassen County, California; Truckee Meadows Water Authority; Truckee Meadows Regional Planning Agency; City of Reno; City of Sparks; Airport Authority of Washoe County; and Susanville Indian Ranchera. This group hereinafter is referred to as "**Cooperating Agencies**". The two project Proponents may be replaced by a local area water purveyor if such transfer of projects responsibility occurs in the future.

In addition to the BLM, Cooperating Agencies, and Proponents, two other agencies are important with respect to this Plan:

- <u>Nevada State Engineer</u> (Nevada Dept. of Conservation and Natural Resources – Division of Water Resources): This agency administers the use of water resources in Nevada, including issuance of water rights.

- <u>U.S. Geological Survey (USGS)</u> (U.S. Dept. of the Interior): This federal agency is the primary water resources data collection agency in the United States. The

USGS is developing a regional groundwater monitoring program in west-central Nevada and adjoining portions of California.

This Plan consists of five principal components:

1. *Previous Monitoring*, related to monitoring of surface water and groundwater resources in Honey Lake Valley, Dry Valley, and Bedell Flat, including location of existing supply and monitoring wells, groundwater extraction rates, groundwater level measurements, flow from springs, water quality, precipitation data, and wetland/riparian conditions;

2. *Monitoring Requirements*, related to production and monitoring wells, elevation control, spring flow, water quality, precipitation stations, quality of data, and reporting;

3. *Management Requirements*, related to the creation and role of a Water Advisory Committee (WAC), and a subcommittee of the WAC – the Technical Advisory Committee (TAC), continued use of numerical groundwater flow models, establishment of action criteria, and details of the decision-making process;

4. *Mitigation Measures*, related to potential mitigation measures that could be implemented if "unreasonable adverse impacts" (to be defined) occur as a result of groundwater extraction associated with the North Valleys Projects; and

5. *Modification of Plan*, related to procedures that would be followed to modify the Plan if future changing conditions or mitigations warrant modification.

The common goal of the Proponents, BLM, Cooperating Agencies, and the Nevada State Engineer (all referred to as "**Parties**") is to develop water resource data relating to a better understanding and analysis to assist the Nevada State Engineer in managing development of groundwater resources in Honey Lake Valley, Dry Valley, and Bedell Flat without resulting in unreasonable adverse impacts to public resources and the prior water rights of other appropriators (i.e., receptors). The Parties agree that groundwater extraction and management decisions would be based on data collected and analyzed for these proposed Projects, and the Parties would collaborate on technical data collection and analysis using the WAC.

The Parties acknowledge that pursuant to NRS 534.110(4) each right to appropriate groundwater in the State of Nevada carries with it the right to make a reasonable lowering of the static groundwater level at the appropriator's point of diversion. Pursuant to NRS 534.110(5) the Nevada State Engineer may allow, at his discretion, the groundwater level to be lowered at the point of diversion of a prior appropriator with the provision that rights of holders of existing appropriations can be satisfied under such express conditions.

The Parties expressly acknowledge that the Nevada State Engineer has, pursuant to both statutory and case law, broad authority to administer groundwater resources in the State of Nevada. The Pyramid Lake Paiute Tribe has jurisdiction over Tribal water. Nothing contained in this Plan shall be construed as waiving or diminishing such authorities.

PREVIOUS MONITORING

The Final EIS for the North Valleys Rights-of-Way Projects contains information about water resources data in Honey Lake Valley, Dry Valley, Bedell Flat, and surrounding areas. This information includes location of existing supply and monitoring wells, groundwater extraction rates, groundwater level measurements, flow from springs, water quality, precipitation data, and wetland/riparian conditions. This information, as well as data available from other local, state, and federal agencies, would be compiled into a central database and expanded as new data are collected.

MONITORING REQUIREMENTS

Generally, monitoring would be the responsibility of the Proponents; however, the USGS is developing a regional groundwater monitoring program in west-central Nevada and adjoining portions of California (i.e., "Regional Study Area"). Objectives are to develop a network of monitoring wells in the Regional Study Area to monitor and document any regional effects of future groundwater development and management on groundwater levels, water quality, and groundwater discharge.

The USGS regional monitoring network would supplement rather than replace individual project monitoring programs. For example, Proponents would monitor their production and monitoring wells, while the USGS monitors other wells within Honey Lake Valley, Dry Valley, Bedell Flat, and surrounding basins. In addition to the Proponents, Washoe County, Lassen County, and/or other agencies also may volunteer to participate in monitoring activities.

The term "as feasible" as used in this Plan relates to mechanical failures or other events/reasons beyond control of the Parties, or agreed to by the Parties, that do not permit data collection.

Production Wells

- Discharge rates and groundwater levels would be measured in production wells on a continuous or frequent basis, as feasible, using permanent recording devices. Water levels would be measured during pumping and non-pumping periods.

- The proposed action includes six production wells at the Fish Springs Ranch property in eastern Honey Lake Valley, five wells in Dry Valley, and two wells in Bedell Flat.

- All monitoring data would be entered into a project database recommended by WAC.

Monitoring Wells

- A network of monitoring wells has been proposed by the Proponents to measure groundwater levels over time. Monitoring wells are located in Honey Lake Valley (**Attachment A**), Dry Valley (**Attachment B**), Bedell Flat (**Attachment C**). The USGS could establish additional monitoring wells in the Regional Study Area that includes surrounding valleys that may be affected by groundwater extraction (e.g., Smoke Creek Desert, Pyramid Lake Valley, Warm Springs Valley, Antelope Valley, and/or Long Valley).

- Groundwater levels would be measured, as feasible, using permanent recording devices in selected monitoring wells. For those monitoring wells without continuous monitoring instruments, water levels would be measured initially on a quarterly basis to establish seasonal variations, followed by semi-annual or annual measurements after such seasonal trends have been established.

- The WAC may recommend that new monitoring well(s) be installed in key areas where there are no existing wells available for monitoring. These new wells would be located and constructed in a cost-effective manner, while meeting the objectives of early-warning detection of impacts, if any, from proposed groundwater extraction. Consideration would be given to completing nested wells that monitor individual aquifers at a single location. The Proponent(s) would be responsible for completing new monitoring well(s), unless another member of the Parties or the USGS agrees to complete the well(s).

- Initiation of groundwater level monitoring could commence as soon as possible, recognizing the desire to obtain baseline data prior to groundwater extraction. Groundwater levels would be measured in each aquifer from which ground water is extracted, as feasible, in basins including and immediately surrounding Honey Lake Valley, Dry Valley, and Bedell Flat.

- Locations and monitoring frequency of the monitoring well network would be reviewed by the WAC on an annual basis, and may be reduced or expanded in scope upon its recommendation.

- All groundwater level monitoring data would be entered into the project database on a regular basis, reflecting the monitoring interval chosen.

Elevation Control

- Ground surface and measuring point elevations would be measured using a survey-grade GPS instrument for production and monitoring wells used as part of this Plan.

- All elevation measurements would be added to the project database containing groundwater level data.

Monitoring Springs and Riparian Areas

- Selected springs and associated riparian areas located in Honey Lake Valley (**Attachment A**), Dry Valley (**Attachment B**), Bedell Flat (**Attachment C**), or surrounding valleys that may be affected by groundwater extraction (e.g., Smoke Creek Desert) would be monitored on a quarterly basis. Monitoring would consist of measuring flow rate and photo-documenting general site conditions (see attachments for proposed site-specific monitoring activities). Flow would be estimated for low flow conditions or where flow is diffuse on the ground surface. Monitoring frequency may be reduced later as recommended by the WAC to semi-annually or annually.

- Initiation of monitoring for springs and riparian areas would commence as soon as possible, recognizing the desire to obtain baseline data prior to groundwater extraction. Monitoring data would be recorded using a standard format for each monitoring event.

Water Quality

- Groundwater samples would be collected from selected production and monitoring wells and analyzed by a laboratory for major ions, trace elements, and/or isotopes. Wells to be sampled, schedule of sample collection, and list of parameters are included in **Attachments A, B,** and **C**.

- Frequency, sampling location, and water quality parameters would be reviewed by the WAC on an annual basis, and may be reduced or expanded in scope upon its recommendation.

Precipitation Stations

- Precipitation stations would be established at the following locations: eastern Honey Lake Valley, western Dry Valley, and central Bedell Flat. Existing precipitation stations would be used where possible. The purpose of collecting precipitation data is to support conclusions regarding changes in groundwater levels with corresponding changes in precipitation, if it occurs.

- All precipitation data would be entered into the project database.

Quality of Data

- Each entity or entities collecting water resource data would ensure that all measurements and data collected are recorded and analyzed in accordance with standard protocol (e.g., USGS and EPA), unless otherwise agreed to by the Parties.

- The water quality sampling program would include standard field and laboratory quality control procedures.

Reporting

- All data collected pursuant to this Plan, would be shared among the Parties.

- All water resource information collected for the North Valleys Projects would be downloaded to a project database and updated periodically on a website accessible to all Parties.

- In addition, an annual summary report would be prepared by the Proponents summarizing information collected during the previous calendar year, including an analysis of any trends. These reports would be provided to the WAC for annual assessment of potential impacts to water resources resulting from groundwater extraction in Honey Lake Valley, Dry Valley, and Bedell Flat.

MANAGEMENT REQUIREMENTS

Water Advisory Committee (WAC) and Technical Advisory Committee (TAC)

- The Parties would establish a Water Advisory Committee (WAC) consisting of representatives from cooperating agencies listed above, BLM, Project Proponents, and Nevada State Engineer. The WAC may also include representatives from the U.S. Environmental Protection Agency and/or U.S. Army Corps of Engineers. A representative of the Nevada State Engineer's Office would be invited to participate as the chair of the WAC.

- The WAC would create a Technical Advisory Committee (TAC) as a subcommittee to the WAC. TAC members would be appointed by the WAC. Roles and responsibilities of the TAC would be determined by the WAC.

- The WAC would meet during the first quarter of each year, or at times mutually agreed upon.

- Purposes and functions of the WAC would be to:

  1. Provide a forum for review of relevant data and analyses.
  2. Share information regarding modeling efforts and model results, if used as part of the monitoring and management program.
  3. Identify needs for additional data collection and scientific investigations.
  4. Develop/refine standards and quality control procedures for data collection and analysis.
  5. Provide status reports and recommendations to the respective Parties.
  6. Form recommendations about monitoring and groundwater management.
  7. Recommend values for monitored variables (water levels, spring discharges, etc.) known as "action criteria", which, if exceeded, would be of concern to the parties.
  8. Evaluate monitoring data to determine if any action criteria have been exceeded, indicating a possible unreasonable adverse impact.
  9. Determine what constitutes an "unreasonable adverse impact" on a case-by-case basis.
  10. Provide the Nevada State Engineer, Washoe County, and other relevant agencies with results of any analyses or technical evaluations, along with recommendations for specific mitigation.

Numerical Groundwater Flow Models

- Previously prepared numerical groundwater flow models would be updated for use by the WAC for predicting future impacts.

- If deemed appropriate by the WAC, Proponents would update each model at the request of the Nevada State Engineer. The Proponents would provide model output in the form of drawdown maps at appropriate intervals as requested by the State Engineer, plots of simulated water levels for the aquifer systems, and results of model calibration.

Action Criteria

- Specific quantitative criteria (action criteria) would be developed by the WAC and recommended to the Nevada State Engineer for possible use to "trigger" management actions.

- Action criteria would be developed by the WAC and recommended to the Nevada State Engineer to provide early warning of unreasonable adverse impacts to public resources and prior water rights of other appropriators. These criteria would be based on changes in groundwater levels, flow of springs, water quality, and/or changes in wetland/riparian habitat that can be attributed to groundwater extraction by the Project(s).

- If and when any action criterion is reached, the following management actions would be triggered:

    1. WAC would conduct thorough fact-finding to determine the level and extent of impacts;
    2. If WAC members agree that the action criterion exceedance is attributable to groundwater extraction by the Project(s), then the WAC would attempt to determine the cause; and
    3. If WAC members agree that the action criterion exceedance is not attributable to groundwater extraction by the Project(s), then further management actions may not be warranted at that time.

- Any member of the WAC may propose a change to any action criterion. Proposed changes would be presented in writing to other members of the WAC, and accompanied by data and scientific analyses to support the proposed change. If supporting analyses are found to be technically sound, the WAC would recommend to the Nevada State Engineer that the action criterion be adjusted, as appropriate.

Decision-Making Process

- If an action criterion is exceeded and attributed to groundwater extraction by the Project(s), the WAC would recommend a course-of-action (i.e., management activity or mitigation measure). If within the WAC, there are: (1) different interpretations regarding relationship of an adverse impact to the Project's groundwater extraction; or (2) different opinions on the course-of-action, the Parties may jointly agree to conduct additional data collection and/or data review and analysis directed at resolving their differences. If not successful, the Parties would refer the issue to their respective managers and the Nevada State Engineer. Nothing herein limits or changes the Nevada State Engineer's authority, and any Party can petition the State Engineer to consider the issue.

- If either of the Parties disagree as to whether the Proponents' proposed or ongoing groundwater extraction would result in unreasonable adverse impacts, they may petition the Nevada State Engineer to determine if adverse impact(s) that require implementation of management or mitigation measures have occurred.

MITIGATION MEASURES

- The Project(s) would mitigate unreasonable adverse impacts either as agreed upon by the Parties or after the Nevada State Engineer determines whether there are unreasonable adverse impacts due to Project(s) groundwater extraction. The Parties would take necessary steps to ensure that mitigation actions are feasible and reasonable.

- Mitigation measures may include one or more of the following:

    1. Geographic redistribution of groundwater extraction;
    2. Reduction or cessation of groundwater extraction from one or more wells;
    3. Restoration/modification of existing habitat;
    4. Establishment of new habitat;
    5. Augmentation of water resources with groundwater extracted for the Project(s);
    6. Purchase other water rights in the area, if available; and/or
    7. Other measures as agreed to by the Parties and/or required by the Nevada State Engineer.

MODIFICATION OF THE PLAN

- The Parties may modify this Plan by mutual agreement. The Parties also acknowledge that the Nevada State Engineer has authority to modify this Plan. In addition, the Parties may individually or jointly petition the Nevada State Engineer to modify this Plan in the event that mutual agreement cannot be reached. Any such petition shall only be filed after 90 days written notice to the remaining Party members. Any Party member, including either Proponent, may submit written comments to the Nevada State Engineer regarding the merits of any petition for modification.

ATTACHMENT A

PROPOSED MONITORING PLAN
FOR
HONEY LAKE VALLEY

ATTACHMENT A
PROPOSED WATER RESOURCES MONITORING PLAN FOR HONEY LAKE VALLEY AREA

This water resources monitoring program is proposed by Fish Springs Ranch for groundwater extraction of up to 8,000 acre-feet per year (af/yr) from six production wells located in eastern Honey Lake Valley, Nevada. The monitoring program would document changes that could be caused by the transition from agricultural pumping to a municipal well field, with groundwater pumped and transported to the Stead/Lemmon Valley areas.

GROUNDWATER LEVELS

In 2003-04, Fish Springs Ranch equipped 14 wells with pressure transducers that automatically record water levels every hour. These wells are shown on **Figure D-1** and are all located in the Nevada portion of eastern Honey Lake Valley. Most of these wells are completed in valley-fill deposits and/or volcanic bedrock. One of the wells (Jarboe MW-1) is completed in alluvial deposits which overlie the volcanic rock aquifer that is monitored by Jarboe MW-2. The existing monitoring network will be expanded to include a monitoring well near the California-Nevada state line.

The proposed six new production wells for Fish Springs Ranch would each be located near one of the existing monitoring wells. Each production well will be equipped with a flow meter to record cumulative water production. Cumulative well production will be recorded at least once per month along with manual measurements of depth to water table made at least weekly at each production well.

Ground surface and measuring point elevations will be measured at each production and monitoring well using a survey-grade GPS instrument. Groundwater level data will be downloaded at least semiannually into a project database and the accuracy of the measurements checked with manual measurements using an electronic sounder. Future groundwater monitoring will be performed by the well field operator and USGS.

Sand and Astor Pass Wells

The monitoring network includes the Sand and Astor Pass areas. One monitoring well is located in the Sand Pass area (Sand Pass MW-1) and two monitoring wells are located in the Astor Pass area (Astor Pass MW-1 and MW-2) (**Figure D-1**). Each is equipped with a recording pressure transducer.

Well Field Perimeter Wells

The monitoring network includes four wells located around the perimeter of the primary well field. These include Neversweat MW-2, Cottonwood MW-2, BB MW-A, and Ferrel Playa Well (**Figure D-1**). Each well is equipped with a recording pressure transducer.

California-Nevada Border

The monitoring well network will be expanded to include an existing well located west of the well field near the California-Nevada border. Prospective wells include USGS-1, USGS-4, or LB-2 (**Figure D-1**). These wells are located approximately 1 mile west of the state line. Permission to utilize the well would be sought from the respective owners. The selected well would be equipped with a recording pressure transducer.

Regional Wells

The USGS will monitor water levels periodically in regional wells that are located within Honey Lake Valley and in other surrounding basins. Specific well locations will be established by the USGS in the near future and added to this monitoring plan at that time.

GROUNDWATER QUALITY

Groundwater quality samples will be collected from all six production wells and selected monitoring wells and analyzed by a laboratory for major ions, trace elements, and/or isotopes. The wells to be sampled, schedule of sample collection, and list of parameters are described below.

The wells to be sampled for laboratory analysis include all production wells and the following monitoring wells: Neversweat MW-2, Cottonwood MW-2, BB MW-A, Ferrel Playa Well, Schaufus Well, and Wilson MW-1 (**Figure D-1**).

The following parameters will be measured in each water sample:

- Field Parameters: Water temperature, pH, and specific conductance.
- Common Ions: Calcium, sodium, potassium, magnesium, chloride, fluoride, sulfate, bicarbonate, nitrate, total dissolved solids, and total suspended solids.
- Trace Elements: Arsenic, barium, copper, iron, lead, manganese, and zinc.
- Isotopes: Oxygen-18 and deuterium.

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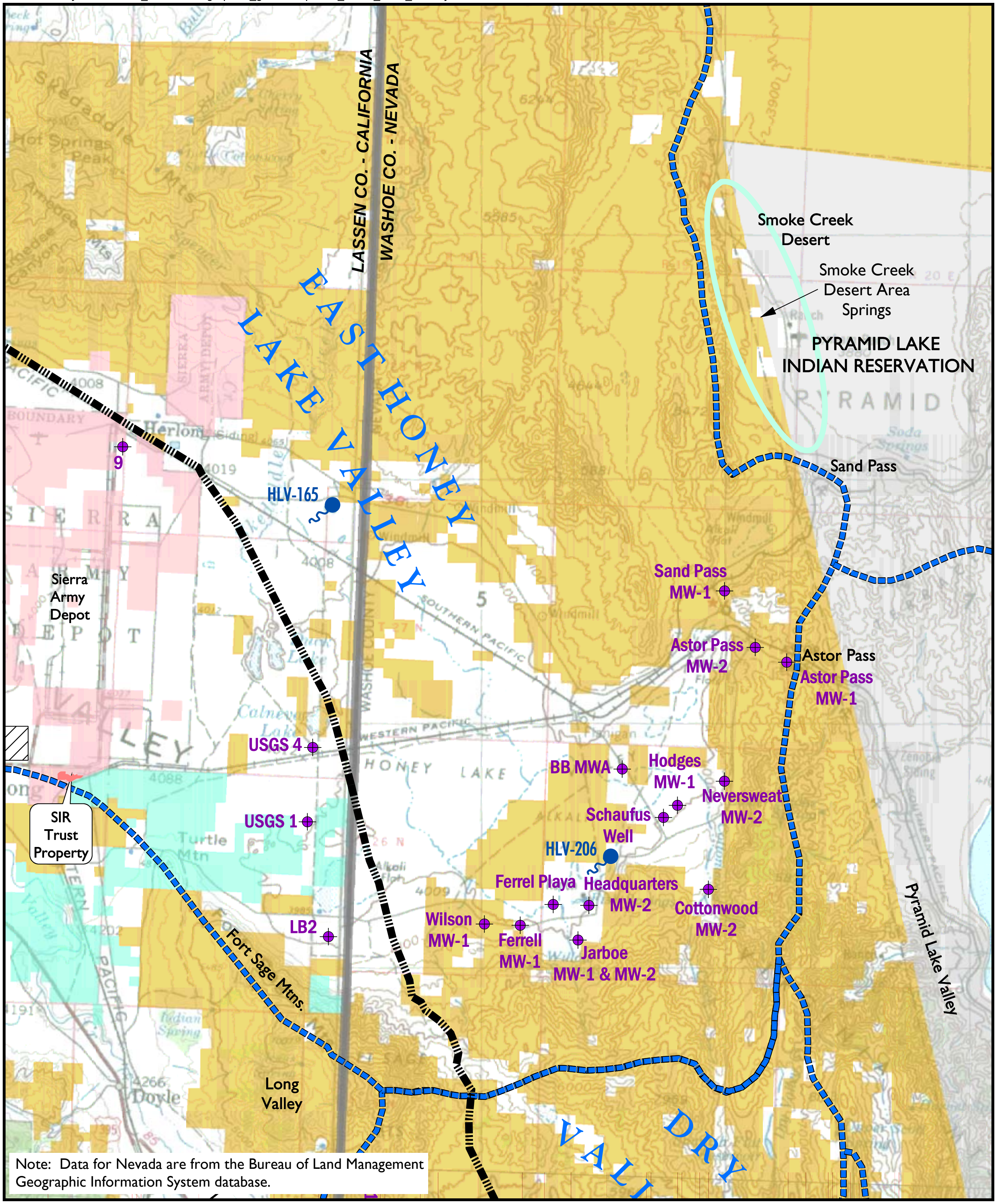

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Public Ownership

Bureau of Land Management

Tuscarora Natural Gas Pipeline

Watershed Boundary

LB2 Monitoring Well

(Ferrel, Jarboe, Headquarters, Hodges, and Schaufus wells are adjacent to proposed production wells)

HLV-165 Spring

Proposed Monitoring Sites
East Honey Lake Valley
North Valleys
Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE D-1

More extensive water quality analysis will be performed for samples from the production wells to meet Safe Drinking Water requirements. Samples will be collected and analyzed from the selected wells on a quarterly basis for the first two years of production well pumping to establish seasonal variations. Thereafter, the wells will be sampled and analyzed semiannually. An exception is that the isotopes will be analyzed only once per year for the first two years.

Frequency, sampling location, and water quality parameters will be reviewed by the WAC on an annual basis, and may be reduced or expanded in scope upon its recommendation.

SPRINGS AND RIPARIAN AREAS

Selected springs and associated riparian areas will be monitored in eastern Honey Lake Valley to determine if pumping from Fish Springs Ranch would have an adverse effect on flow and/or vegetative conditions. The springs selected for monitoring are: HLV-206 (depressional wetland area); HLV-165 (High Rock Spring inside CA border); and one of the springs in Smoke Creek Desert near Sand Pass (HLV-168 through HLV-183) (**Figure D-1**). Monitoring activities will be conducted on a quarterly basis, with information periodically entered into the project database. Monitoring activities will include the following:

- <u>Flow</u>: Flow rate of water discharging from the spring will be measured using a flow meter or portable flume. Alternatively, a staff gage can be installed to measure relative changes in water level if the flow is in a well-defined channel. For low flows or dispersed flows on the ground surface, flows can be estimated.

- <u>Photo-Documentation of Vegetation</u>: One or more photographs will be taken of the spring site from the same location each time so that relative changes in vegetation and overall site conditions can be evaluated.

PRECIPITATION

A precipitation gage will be installed at Fish Springs Ranch to measure precipitation amount on a daily basis. This information will be recorded weekly by the well field operator, and periodically entered into the project database.

ATTACHMENT B

PROPOSED MONITORING PLAN
FOR
DRY VALLEY

ATTACHMENT B
PROPOSED WATER RESOURCES MONITORING PLAN FOR DRY VALLEY AREA

This water resources monitoring program is proposed by Intermountain Water Supply for groundwater extraction of up to 2,000 acre-feet per year (af/yr) from five production wells located in Dry Valley, Nevada. The monitoring program would document changes that could be caused by the pumping and transfer of water from Dry Valley to the Stead/Lemmon Valley areas.

GROUNDWATER LEVELS

Depth to groundwater will be measured in all production wells (DV-1 through DV-5) on a daily basis using pressure transducers or sounding probes. Each production well will be equipped with a flow meter to record cumulative water production. Cumulative well production will be recorded at least once per month.

A network of 15 monitoring well sites will be measured for water levels on a minimum quarterly basis. Locations are shown on **Figure D-2** and listed in **Table D-1**. Two of the sites located near the CA-NV state line are nested piezometers (DVM-15/-16 and DVM-17/-18/-19) recently installed by the USGS. All of the wells are located on private property, with the exception of DVM-1 which is located on BLM public land. Permission is still needed from some land owners to gain access to some of the monitoring wells.

Four 6-inch diameter test wells (DVM-1 through DVM-4) ranging in depth from 700 to 800 feet are being installed this year (2005) at the locations of proposed production wells. These test wells will be established as nearby monitoring wells for the production wells that will be installed at a later date. One new monitoring well is proposed for the center of the lower valley floor where deep monitoring wells are presently absent. This new well would be completed to a depth of 700 to 800 feet.

Continuous water level recorders will be installed on two shallow wells (DVM-6 and DVM-17) and two deep wells (DVM-5 and DVM-9 or DVM-18). This will allow daily tracking of water levels from these wells.

Ground surface and measuring point elevations will be measured at each production and monitoring well using a survey-grade GPS instrument. Groundwater level data will be downloaded at least semiannually into a project database and the accuracy of the measurements checked with manual measurements using an electronic sounder. Future groundwater monitoring will be accomplished by a combination of efforts of the well field operator and USGS.

TABLE D-1 Proposed Monitoring and Production Wells for Dry Valley, Nevada				
Well Number	Well Type	Well Depth (feet)	Well Diameter (inches)	Monitoring
DVM-1	Test/Mon. Well	710	6	Water Level Only
DVM-2	Test/Mon. Well	800	6	Water Level Only
DVM-3	Test/Mon. Well	700	6	Water Level Only
DVM-4	Test/Mon. Well	800	6	Water Level Only
DVM-5	Test/Mon. Well	600	2	Water Level Only
DVM-6	Monitoring Well	35	2	Water Level Only
DVM-7	Monitoring Well	20	2	Water Level Only
DVM-8	Monitoring Well	23	2	Water Level Only
DVM-9 (Lenz)	Domestic Well	100	6	Water Level Only
DVM-10 & -11	Monitoring Well	32	2	Water Level Only
DVM-12	Monitoring Well	Unknown	12	Water Level Only
DVM-13	Abandoned Domestic Well	28	8	Water Level Only
DVM-14	Test/Mon. Well	140	6	Water Level Only
DVM-15 & -16	Monitoring Well – Nested Piezometers	150, 385	2	Water Level Only
DVM-17, -18, & -19	Monitoring Well – Nested Piezometers	40, 250, 547	2	Water Level; Quality for DVM-17 & -18
DVM-20	Monitoring Well	20	2	Water Level Only
DV-1	Production Well	700 – 800	12 – 16	Water Level and Quality
DV-2	Production Well	700 – 800	12 – 16	Water Level and Quality
DV-3	Production Well	700 – 800	12 – 16	Water Level and Quality
DV-4	Production Well	700 – 800	12 – 16	Water Level and Quality
DV-5	Production Well	700 – 800	12 – 16	Water Level and Quality
New Well	Monitoring Well – To Be Completed	700 – 800	2	Water Level Only

See Figure D-2 for well locations.

GROUNDWATER QUALITY

Groundwater quality samples will be collected from all five production wells and selected monitoring wells and analyzed by a laboratory for major ions, trace elements, and/or isotopes. The wells to be sampled for laboratory analysis include all production wells (DV-1 through DV-5) and the following two nested monitoring wells: DVM-17 (shallow) and DVM-18 (deep) located near the state line (**Figure D-2**).

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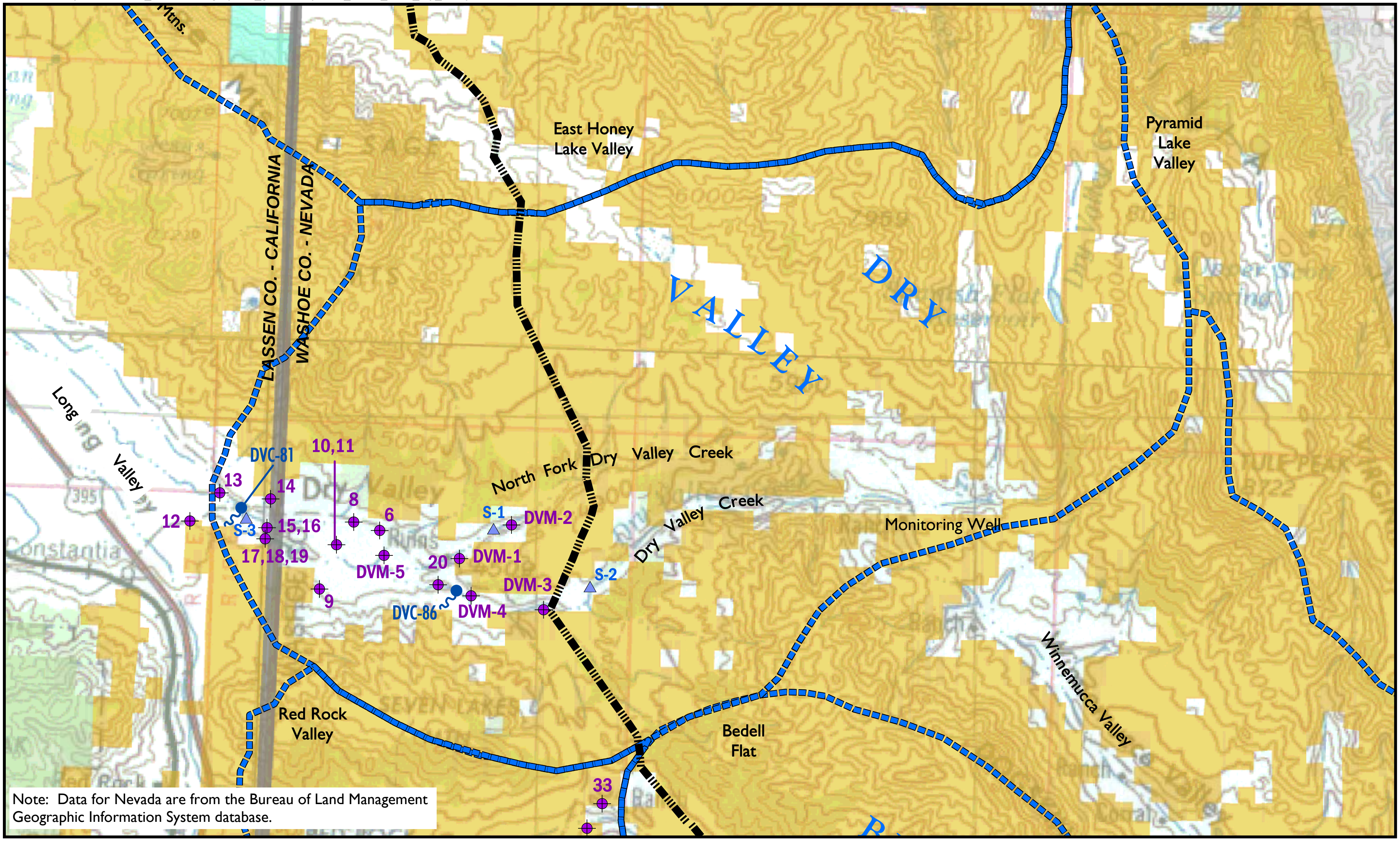


0 Miles 2

37 Monitoring Well
(DVM-1 through DVM-5
are adjacent to proposed
production wells)

S-1 Stream Gage

DVC-81 Spring

Public Ownership

Bureau of Land Management

Tuscarora Natural Gas Pipeline

Watershed Boundary

Proposed Monitoring Sites
Dry Valley
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE D-2

The following parameters will be measured in each water sample:

- Field Parameters: Water temperature, pH, and specific conductance.
- Common Ions: Calcium, sodium, potassium, magnesium, chloride, fluoride, sulfate, bicarbonate, nitrate, total dissolved solids, and total suspended solids.
- Trace Elements: Arsenic, barium, copper, iron, lead, manganese, and zinc.
- Isotopes: Oxygen-18 and deuterium.

More extensive water quality analysis will be performed for samples from the production wells to meet Safe Drinking Water requirements. Samples will be collected and analyzed from the selected wells on a quarterly basis for the first two years of production well pumping to establish seasonal variations. Thereafter, the wells will be sampled and analyzed semiannually. An exception is that the isotopes will be analyzed only once per year for the first two years.

Frequency, sampling location, and water quality parameters will be reviewed by the WAC on an annual basis, and may be reduced or expanded in scope upon its recommendation.

STREAM FLOW

Miscellaneous stream flow measurements in Dry Valley Creek and North Fork Dry Valley Creek have been made in the past 4 years by the USGS (Berger 2004) and Intermountain Water Supply. Perennial flow is observed to occur in the upgradient portions of these streams until the drainages discharge to the lower valley floor. The proposed production wells are located near the transition zone from perennial to ephemeral or intermittent flows. Approximately 2.5 miles farther downstream near the CA-NV state line, Dry Valley Creek is observed to maintain a small perennial flow for a short reach.

Three continuous stage recorders will be installed on lower North Fork Dry Valley Creek (S-1), upper Dry Valley Creek (S-2), and lower Dry Valley Creek (S-3 near the state line) (**Figure D-2**). The stage data will converted to flow rate using rating curve information developed from various flow measurements made over a range of flow conditions. This information will better characterize baseline stream flow conditions, and provide a means to monitor potential effects of production wells pumping on surface water flow.

SPRINGS AND RIPARIAN AREAS

Selected springs and associated riparian areas will be monitored in Dry Valley to determine if pumping from the production wells would have an adverse effect on flow and/or vegetative conditions. The springs selected for monitoring are: DVC-81 (seepage from Dry Valley Creek into a pond); and DVC-86 (Duckweed Spring) (**Figure D-2**). Monitoring activities will be conducted on a quarterly basis, with information periodically entered into the project database. Monitoring activities will include the following:

- Flow: Flow rate of water discharging from the spring will be measured using a flow meter or portable flume. Alternatively, a staff gage can be installed to measure relative changes in water level if the flow is in a well-defined channel. For low flows or dispersed flows on the ground surface, flows can be estimated.

- Photo-Documentation of Vegetation: One or more photographs will be taken of the spring site from the same location each time so that relative changes in vegetation and overall site conditions can be evaluated.

PRECIPITATION

A precipitation gage will be installed in Dry Valley to measure precipitation amount on a daily basis. This information will be recorded weekly by the well field operator, and periodically entered into the project database.

ATTACHMENT C

PROPOSED MONITORING PLAN
FOR
BEDELL FLAT

ATTACHMENT C
PROPOSED WATER RESOURCES MONITORING PLAN FOR BEDELL FLAT AREA

This water resources monitoring program is proposed by Intermountain Water Supply for groundwater extraction of up to 500 acre-feet per year (af/yr) from two production wells located in Bedell Flat, Nevada. The monitoring program would document changes that could be caused by the pumping and transfer of water from Bedell Flat to the Stead/Lemmon Valley areas.

GROUNDWATER LEVELS

Depth to groundwater will be measured in all production wells (BFM-1 and BFM-2) on a daily basis using pressure transducers or sounding probes. Each production well will be equipped with a flow meter to record cumulative water production. Cumulative well production will be recorded at least once per month.

A network of 9 to 12 monitoring well sites will be measured for water levels on a minimum quarterly basis. Locations are shown on **Figure D-3** and listed in **Table D-2**. The existing BLM stock water well in the center of the valley floor will be used for the monitoring program. Three to five domestic wells in Red Rock Estates and two or three wells in the northeast corner of Red Rock Valley would be included for water level monitoring. Permission is still needed from some land owners to gain access to some of the monitoring wells.

Three new monitoring wells are proposed for Bedell Flat, all located on BLM land. One location is to the west of proposed production well BFM-2, upgradient of Campbell Ranch Spring, for purposes of monitoring shallow groundwater in that area. The two other proposed new monitoring wells are located in the central portion of the basin to expand coverage on the valley floor at intermediate locations between the production wells and the domestic wells at Red Rock Estates.

Continuous water level recorders will be installed on two of the new monitoring wells (BFM-3 and BFM-6). This will allow daily tracking of water levels from these wells.

Ground surface and measuring point elevations will be measured at each production and monitoring well using a survey-grade GPS instrument. Groundwater level data will be downloaded at least semiannually into a project database and the accuracy of the measurements checked with manual measurements using an electronic sounder. Future groundwater monitoring will be accomplished by a combination of efforts of the well field operator and USGS.

TABLE D-2 Proposed Monitoring and Production Wells for Bedell Flat, Nevada				
Well Number	Well Type	Well Depth (feet)	Well Diameter (inches)	Monitoring
BFM-1	Production Well	950	16	Water Level and Quality
BFM-2	Production Well	400	12	Water Level and Quality
BFM-3	New Monitoring Well	80	2	Water Level and Quality
BFM-4	Stock Water Well	180	6	Water Level Only
BFM-5	New Monitoring Well	150	2	Water Level Only
BFM-6	New Monitoring Well	200	2	Water Level and Quality
NE Red Rock Valley Domestic Wells (2 or 3 wells)	Domestic Wells	160 – 400	6	Water Level Only
Red Rock Estates Domestic Wells (3 to 5 wells)	Domestic Wells	140 – 970	6	Water Level Only

See Figure D-3 for well locations.

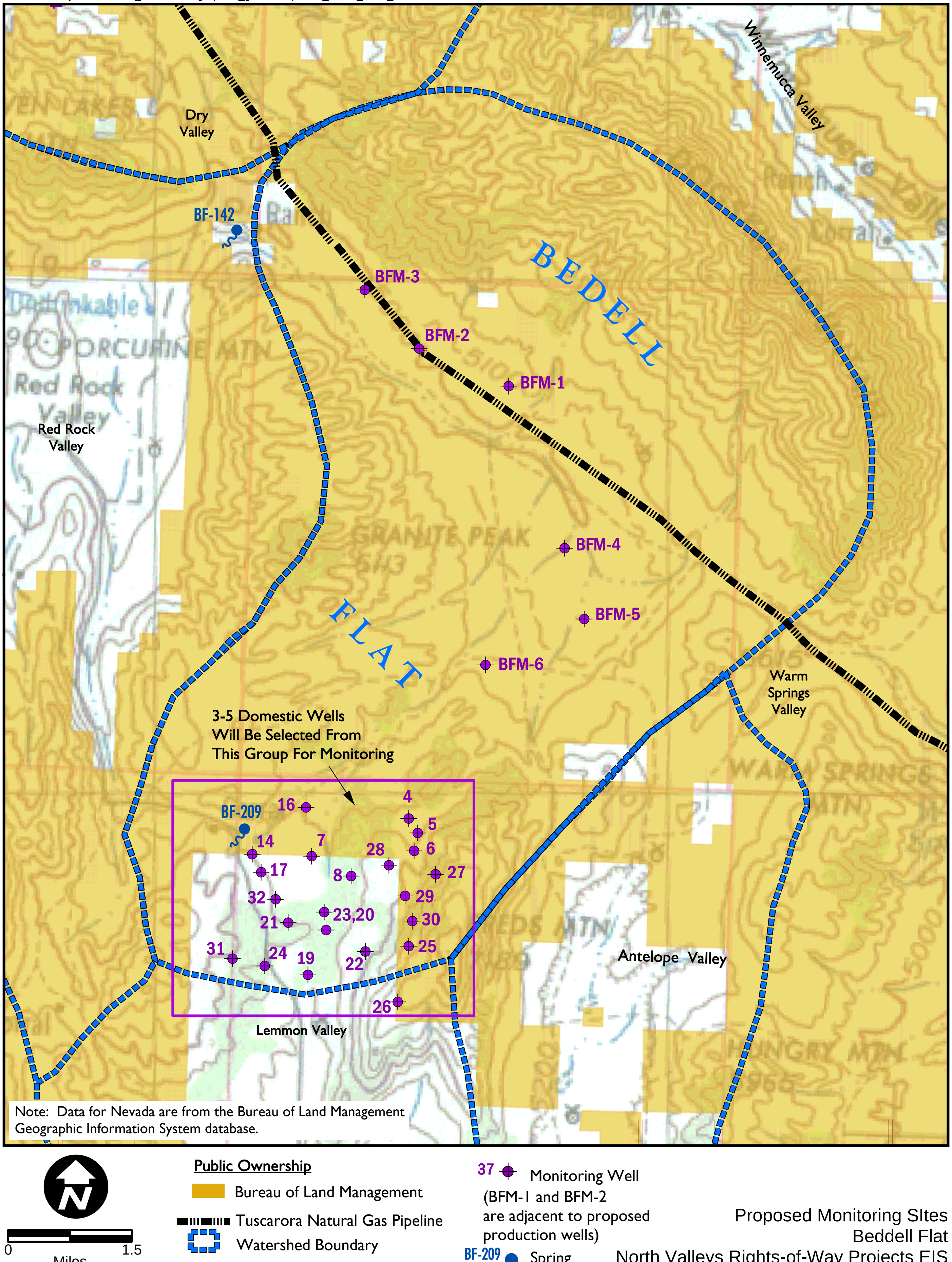
GROUNDWATER QUALITY

Groundwater quality samples will be collected from the two production wells and selected monitoring wells and analyzed by a laboratory for major ions, trace elements, and/or isotopes. The wells to be sampled for laboratory analysis include the production wells (BFM-1 and BFM-2) and the following two monitoring wells: BFM-3 and BFM-6 (**Figure D-3**).

The following parameters will be measured in each water sample:

- Field Parameters: Water temperature, pH, and specific conductance.
- Common Ions: Calcium, sodium, potassium, magnesium, chloride, fluoride, sulfate, bicarbonate, nitrate, total dissolved solids, and total suspended solids.
- Trace Elements: Arsenic, barium, copper, iron, lead, manganese, and zinc.
- Isotopes: Oxygen-18 and deuterium.

More extensive water quality analysis will be performed for samples from the production wells to meet Safe Drinking Water requirements. Samples will be collected h:\North Valleys EIS\maxim_documents\graphics_gis\arcmap\draft_eis\ex_wells_beddell.mxd



Proposed Monitoring SItes
Beddell Flat
North Valleys Rights-of-Way Projects EIS
Washoe County, Nevada
FIGURE D-3

and analyzed from the selected wells on a quarterly basis for the first two years of production well pumping to establish seasonal variations. Thereafter, the wells will be sampled and analyzed semiannually. An exception is that the isotopes will be analyzed only once per year for the first two years.

Frequency, sampling location, and water quality parameters will be reviewed by the WAC on an annual basis, and may be reduced or expanded in scope upon its recommendation.

SPRINGS AND RIPARIAN AREAS

Selected springs and associated riparian areas will be monitored in Bedell Flat to determine if pumping from the production wells would have an adverse effect on flow and/or vegetative conditions. The springs selected for monitoring are: BF-142 (Campbell Ranch Spring); and BF-209 (Bird Spring) (**Figure D-3**). Monitoring activities will be conducted on a quarterly basis, with information periodically entered into the project database. Monitoring activities will include the following:

- Flow: Flow rate of water discharging from the spring will be measured using a flow meter or portable flume. Alternatively, a staff gage can be installed to measure relative changes in water level if the flow is in a well-defined channel. For low flows or dispersed flows on the ground surface, flows can be estimated.

- Photo-Documentation of Vegetation: One or more photographs will be taken of the spring site from the same location each time so that relative changes in vegetation and overall site conditions can be evaluated.

PRECIPITATION

A precipitation gage will be installed in Bedell Flat to measure precipitation amount on a daily basis. This information will be recorded weekly by the well field operator, and periodically entered into the project database.

APPENDIX E

June 2005 Groundwater Quality Data for Fish Springs Ranch Wells

APPENDIX E

WATER QUALITY SAMPLE RESULTS FOR FISH SPRINGS RANCH WELLS Sampled June 20, 2005					
Parameter	**Hodges Well**	**Headquarters Well**	**Jarboe Well**	**Ferrel Well**	**Ford Well**
General Parameters					
Alkalinity, Total	120	103	97	128	97
Alkalinity/Bicarbonate	120	99	97	122	97
Alkalinity/Carbonate	<2	4	<2	6	<2
Alkalinity/Hydroxide	<2	<2	<2	<2	<2
Color Apparent (c.u.)	<5	<5	<5	<5	<5
pH (std. units)	8	8.39	8.27	8.42	8.26
Total Dissolved Solids	200	190	170	280	490
Turbidity (NTU)	0.2	0.2	0.1	0.2	0.2
Cations					
Calcium	11	2.9	13	10	21
Magnesium	5.2	1.6	4.7	2.7	1.9
Potassium	7	7.4	6.3	6.3	3.5
Sodium	35	47	25	72	140
Anions					
Chloride	6.1	6.2	5.9	26	21
Fluoride	<0.1	<0.1	<0.1	0.3	1.2
Sulfate	6.6	8.6	6.6	35	220
Nutrients					
Cyanide, Total	<0.005	<0.005	<0.005	<0.005	0.04
Nitrate-N	0.75	1	1.1	1.1	<0.05
Nitrite-N	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate + Nitrite	0.75	1	1.1	1.1	<0.1
Metals and Metalloids					
Aluminum	<0.05	<0.05	<0.05	<0.05	<0.05
Antimony	<0.002	<0.002	<0.002	<0.002	<0.002
Arsenic	<0.001	0.002	0.002	0.008	0.039
Barium	0.034	0.009	0.003	0.006	<0.001
Beryllium	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	<0.001	<0.001	<0.001	0.001	<0.001
Copper	<0.001	<0.001	<0.001	<0.001	0.001
Iron	<0.05	<0.05	<0.05	<0.05	0.09
Lead	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	0.001	<0.001	<0.001	<0.001	0.023
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	<0.001	0.001	<0.001	<0.001	<0.001
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	<0.001	<0.001	<0.001	<0.001	<0.001
Thallium	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Uranium	<0.001	<0.001	0.001	0.002	<0.001
Zinc	<0.02	<0.02	<0.02	<0.02	<0.02

Note: All units are in milligrams per liter (mg/L) unless otherwise specified in first column.
Note: c.u. = color units; NTU = nephelometric turbidity units.
Note: Metals are reported as Total Recoverable concentrations.
Source: Laboratory reports from Sierra Environmental Monitoring, Inc., Reno, NV, dated 7/12/05.

APPENDIX F

Pumping History and Groundwater Levels for Fish Springs Ranch Wells

TABLE F-1

Fish Springs Ranch Pumpage Estimates for Irrigation Wells

Year	Approx. Land Area Irrigated (Acres)	Total Well Pumpage (Acre-Feet) @ 4 Feet/Acre	Source
2003	1042	4168	Known Acres
2002	1264	5056	Known Acres
2001	1060	4240	Known Acres
2000	1045	4180	Digitized Aerial Photo
1999	1100	4400	Approx average of 2000 & 1994
1998	1100	4400	Approx average of 2000 & 1994
1997	1100	4400	Approx average of 2000 & 1994
1996	1100	4400	Approx average of 2000 & 1994
1995	1100	4400	Approx average of 2000 & 1994
1994	1130	4520	Digitized Aerial Photo
1993	1155	4620	Digitized Aerial Photo
1992	1260	5040	Digitized Aerial Photo
1988	N/A	5900	Handman et.al. 1990

Images for 1990 and 1991 unavailable. 1988 estimate from Handman et al. 1990.

All other estimates from D. Merrill of Vidler Water Co.

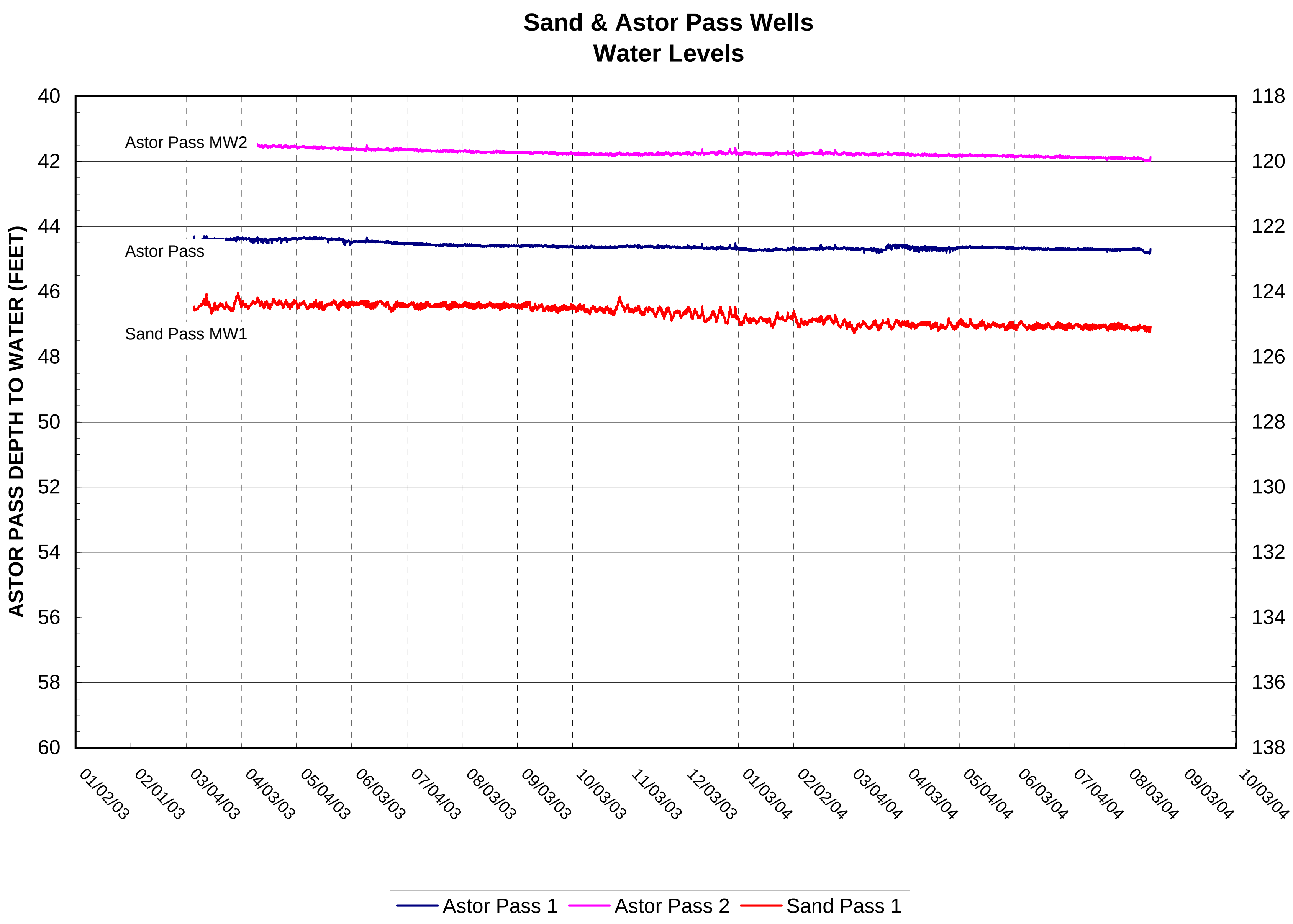
TABLE F-2

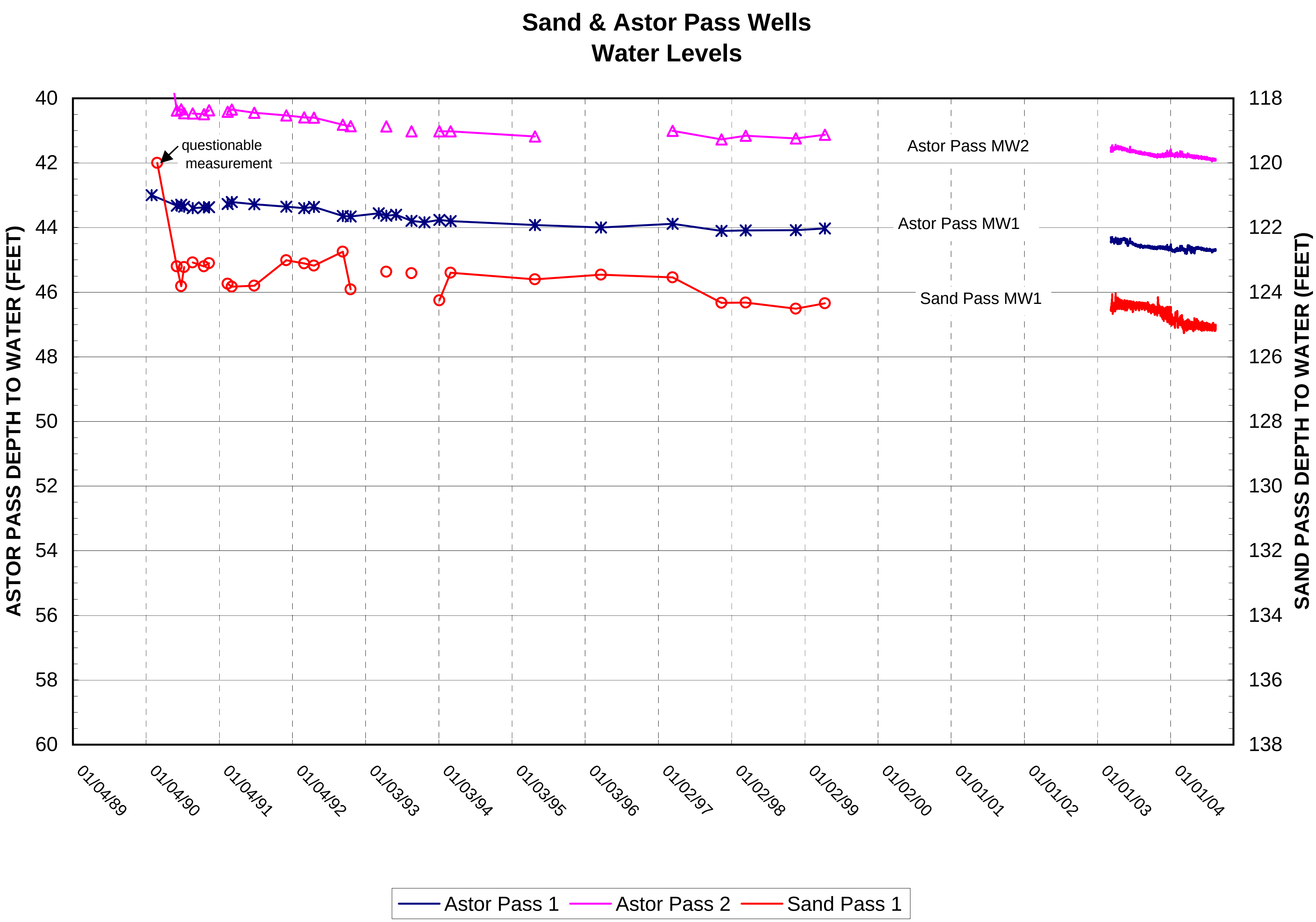
Fish Springs Ranch 2003 Well Withdrawals

Well	Meter Reading (gallons)	Water Volume (acre-feet)
Ford (nee Wilson)	243,027,000	746
Ferrel	116,996,000	359
Jarboe	99,528,000	305
HQ (south meter)	139,766,000	429
HQ (north meter)	324,250,000	995
Hodges	169,721,000	521
TOTAL	1,093,288,000	3355

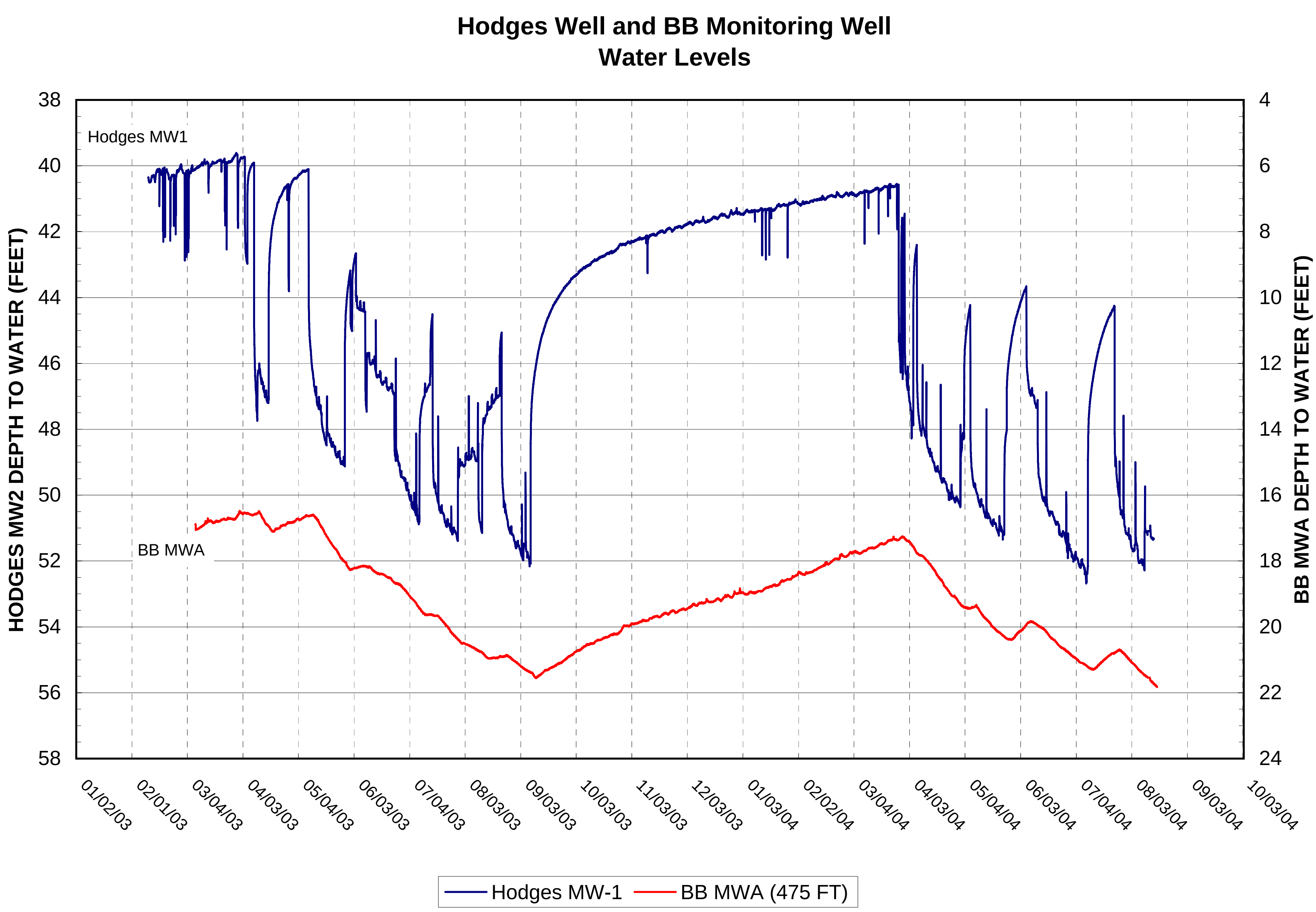
Well	Discharge (gal/min)	Acre-feet per Month
Ford (nee Wilson)	1500	199
Ferrel	1100	146
Jarboe	2000	265
HQ (south meter)	1600	212
HQ (north meter)	1020	135
Hodges	1280	170
TOTAL	8500	1127

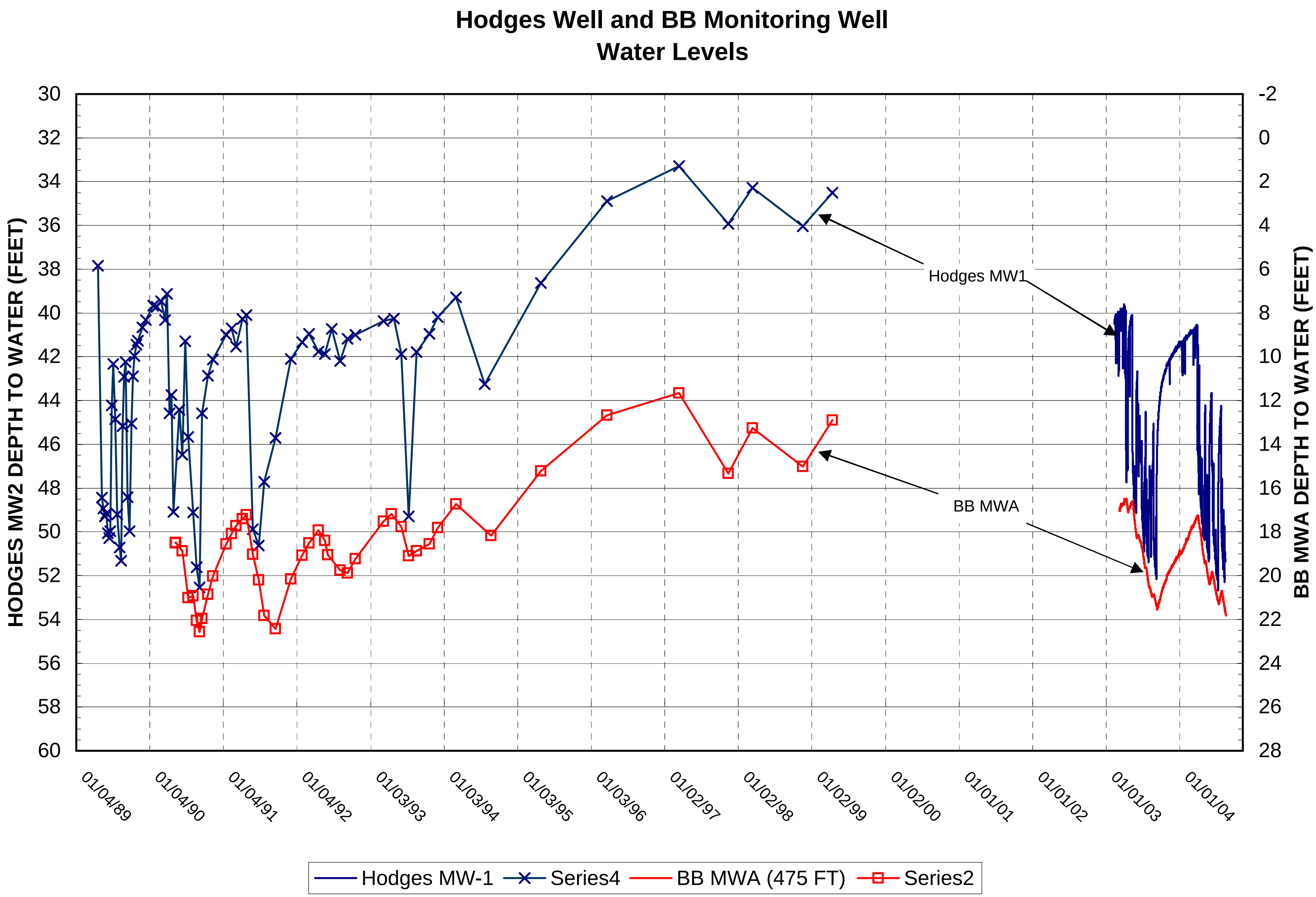
Meters read 11/13/03 by Peter Sinclair


Sand & Astor Pass Wells
Water Levels
ASTOR PASS DEPTH TO WATER (FEET)
SAND PASS DEPTH TO WATER (FEET)
40
42
44
46
48
50
52
54
56
58
60
118
120
122
124
126
128
130
132
134
136
138
Astor Pass MW2
Astor Pass
Sand Pass MW1
01/02/03
02/01/03
03/04/03
04/03/03
05/04/03
06/03/03
07/04/03
08/03/03
09/03/03
10/03/03
11/03/03
12/03/03
01/03/04
02/02/04
03/04/04
04/03/04
05/04/04
06/03/04
07/04/04
08/03/04
09/03/04
10/03/04
Astor Pass 1
Astor Pass 2
Sand Pass 1

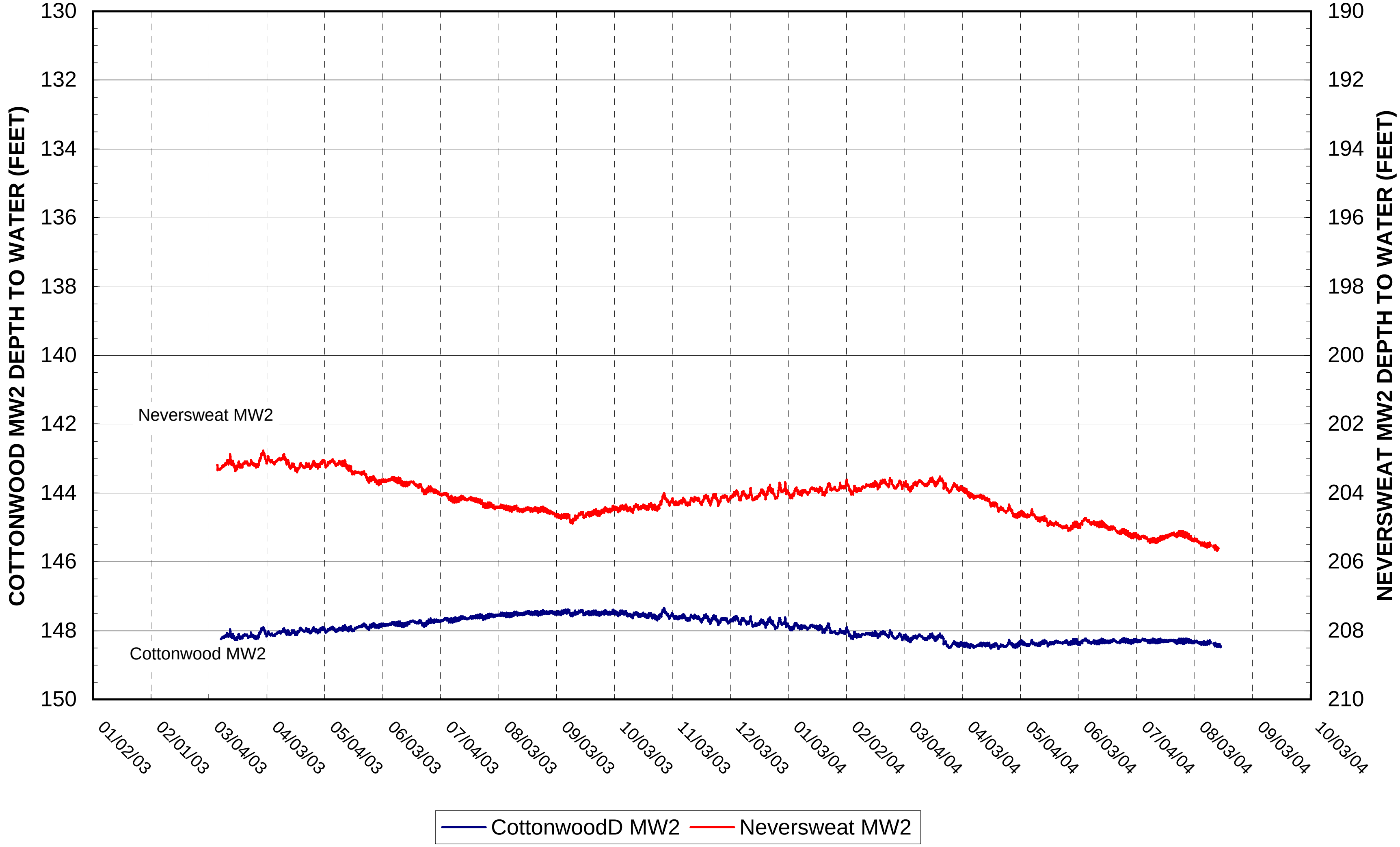


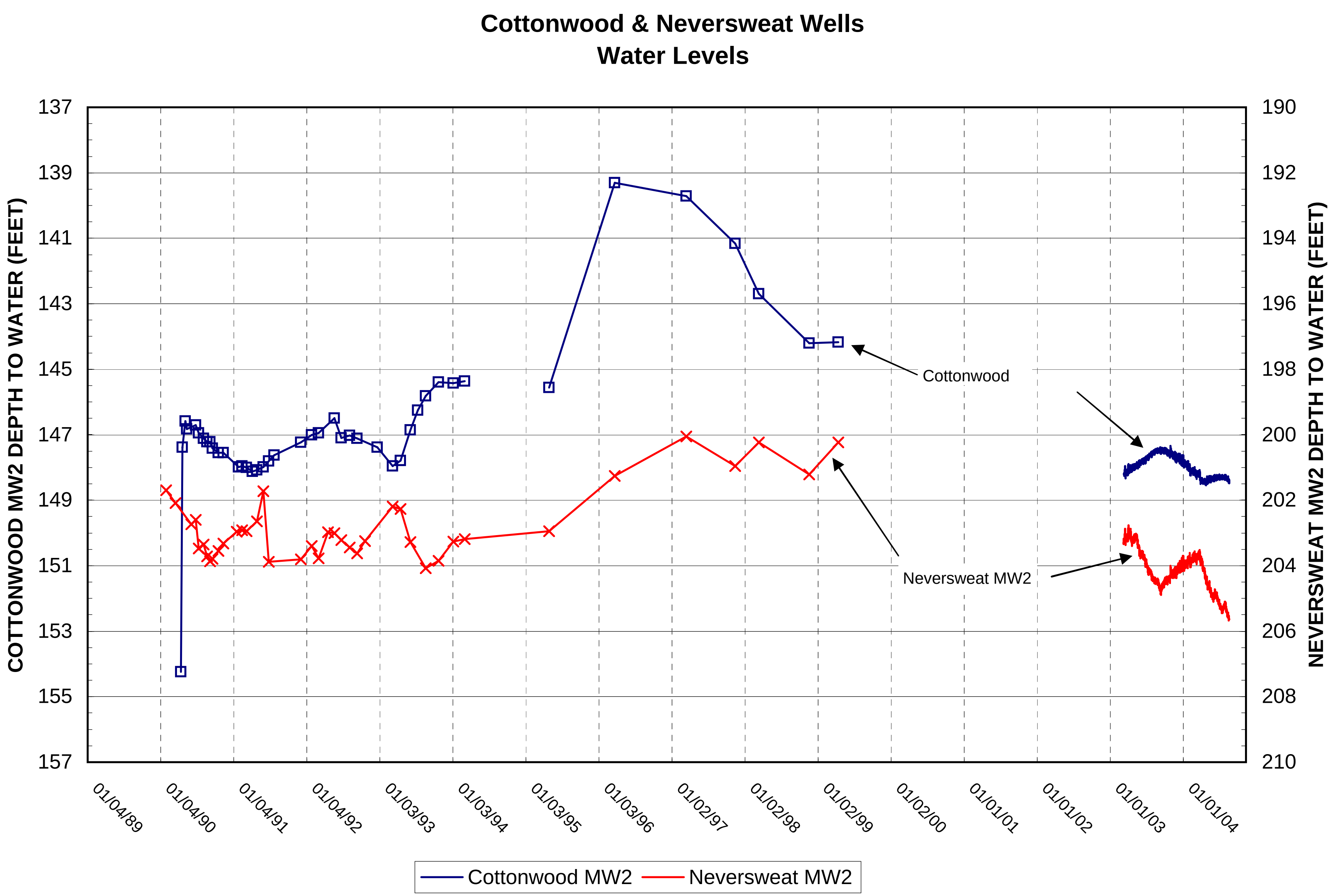
Sand & Astor Pass Wells
Water Levels
ASTOR PASS DEPTH TO WATER (FEET)
SAND PASS DEPTH TO WATER (FEET)
40
42
44
46
48
50
52
54
56
58
60
118
120
122
124
126
128
130
132
134
136
138
questionable measurement
Astor Pass MW2
Astor Pass MW1
Sand Pass MW1
01/04/89
01/04/90
01/04/91
01/04/92
01/03/93
01/03/94
01/03/95
01/03/96
01/02/97
01/02/98
01/02/99
01/02/00
01/01/01
01/01/02
01/01/03
01/01/04
Astor Pass 1
Astor Pass 2
Sand Pass 1


Hodges Well and BB Monitoring Well
Water Levels
Hodges MW1
BB MWA
HODGES MW2 DEPTH TO WATER (FEET)
BB MWA DEPTH TO WATER (FEET)
38
40
42
44
46
48
50
52
54
56
58
4
6
8
10
12
14
16
18
20
22
24
01/02/03
02/01/03
03/04/03
04/03/03
05/04/03
06/03/03
07/04/03
08/03/03
09/03/03
10/03/03
11/03/03
12/03/03
01/03/04
02/02/04
03/04/04
04/03/04
05/04/04
06/03/04
07/04/04
08/03/04
09/03/04
10/03/04
Hodges MW-1
BB MWA (475 FT)


Hodges Well and BB Monitoring Well
Water Levels
HODGES MW2 DEPTH TO WATER (FEET)
BB MWA DEPTH TO WATER (FEET)
30
32
34
36
38
40
42
44
46
48
50
52
54
56
58
60
-2
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
01/04/89
01/04/90
01/04/91
01/04/92
01/03/93
01/03/94
01/03/95
01/03/96
01/02/97
01/02/98
01/02/99
01/02/00
01/01/01
01/01/02
01/01/03
01/01/04
Hodges MW1
BB MWA
Hodges MW-1
Series4
BB MWA (475 FT)
Series2

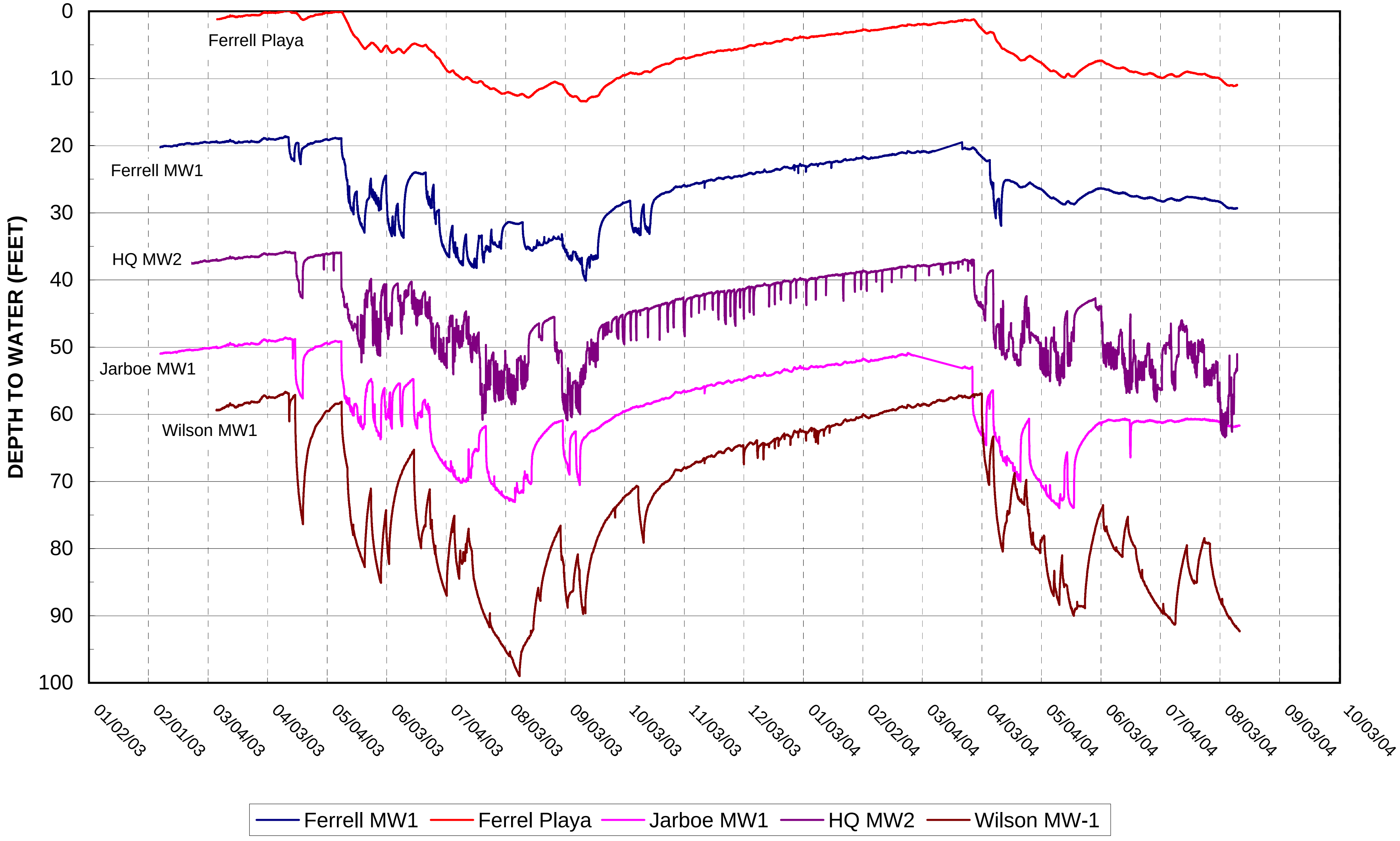
Cottonwood & Neversweat Wells
Water Levels

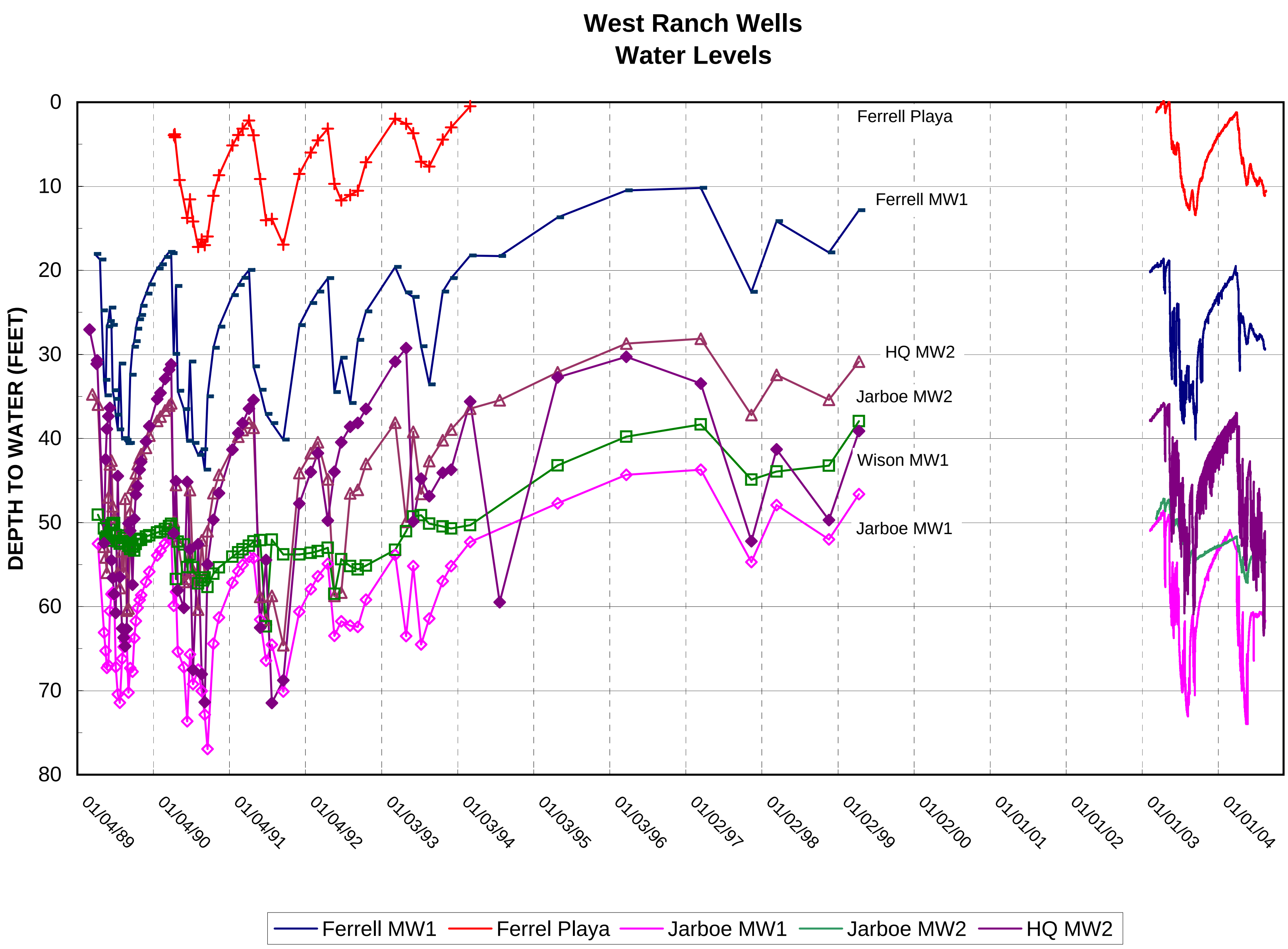


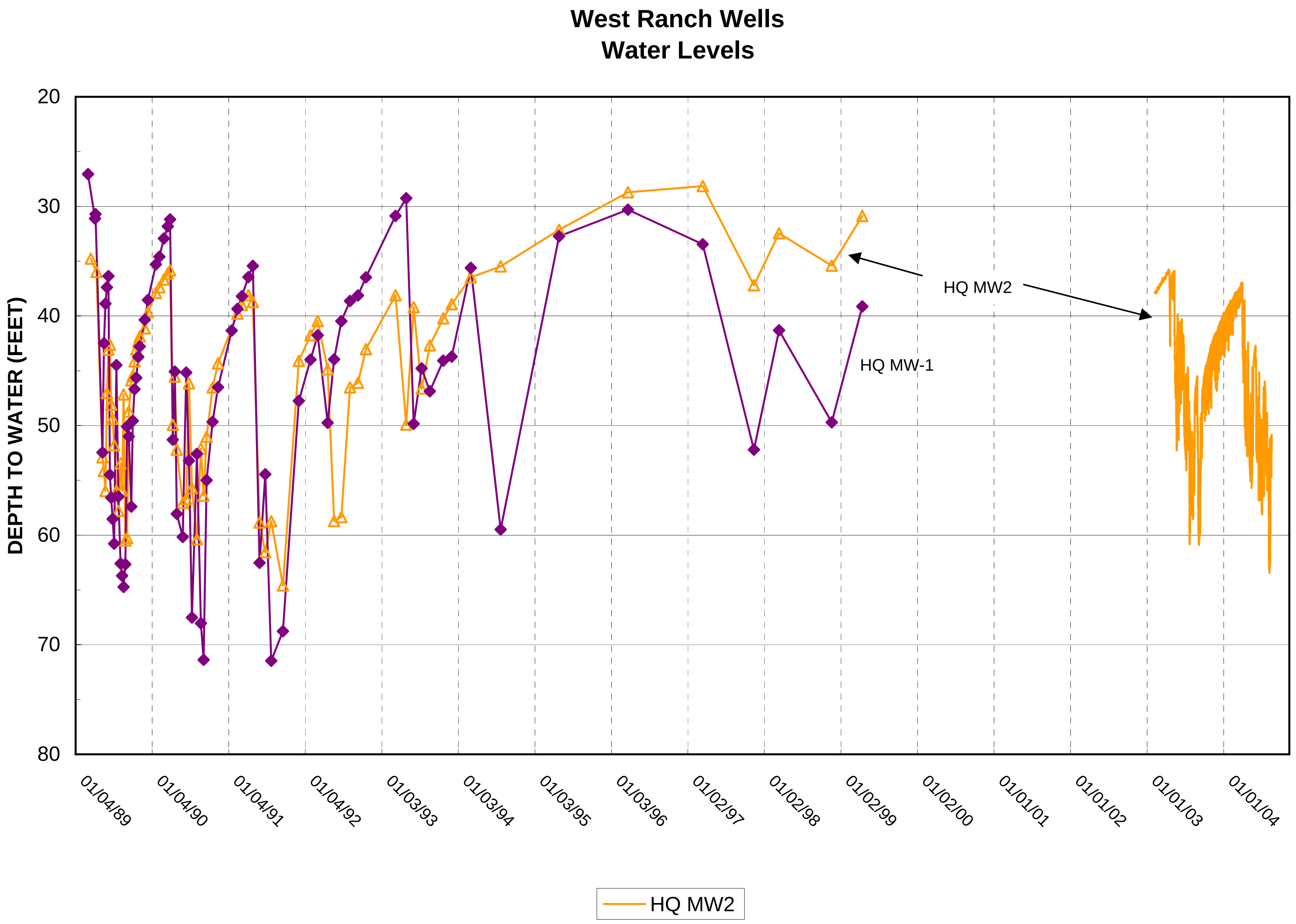


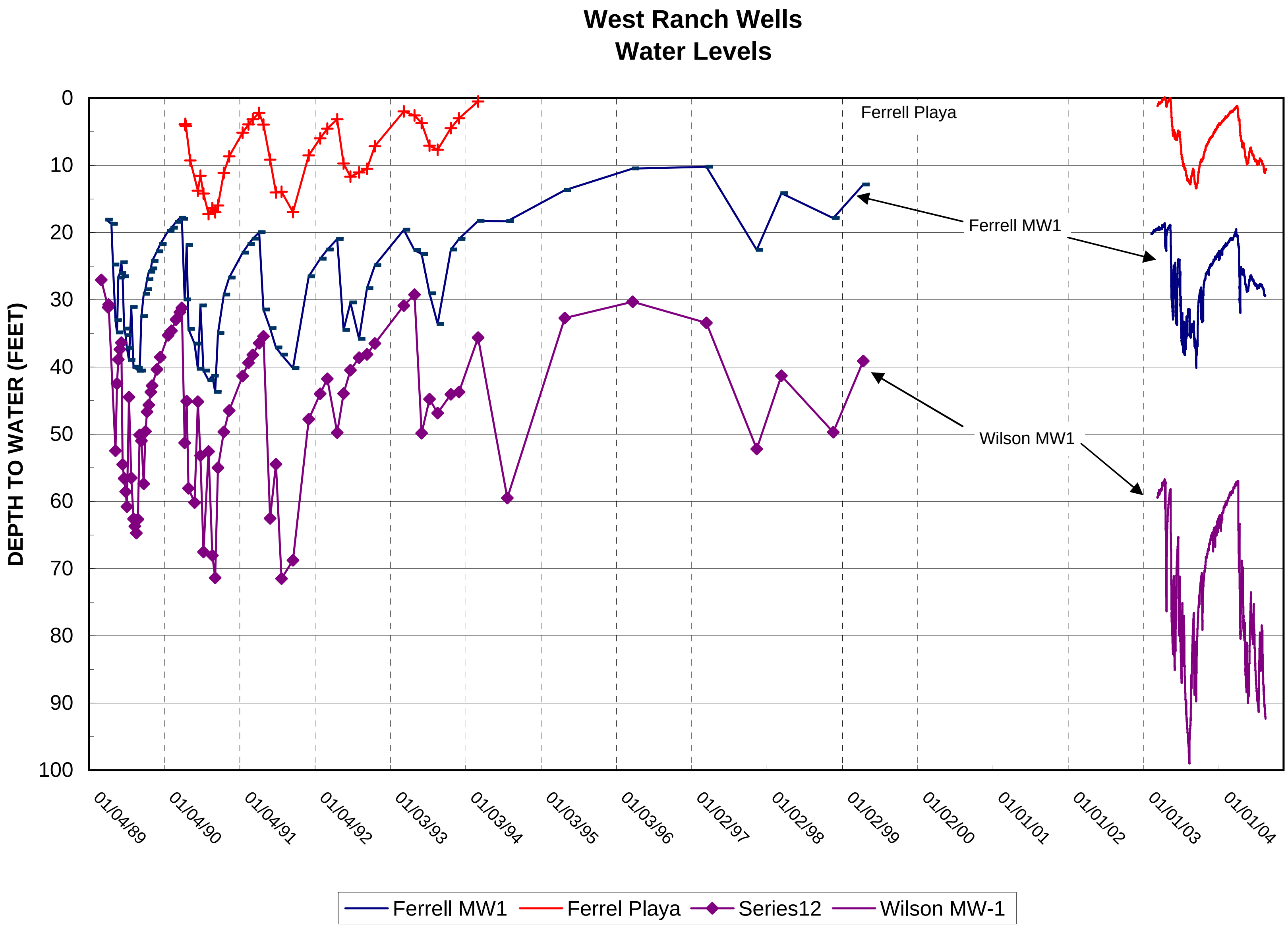
Cottonwood & Neversweat Wells
Water Levels
137
139
141
143
145
147
149
151
153
155
157
190
192
194
196
198
200
202
204
206
208
210
COTTONWOOD MW2 DEPTH TO WATER (FEET)
NEVERSWEAT MW2 DEPTH TO WATER (FEET)
Cottonwood
Neversweat MW2
01/04/89
01/04/90
01/04/91
01/04/92
01/03/93
01/03/94
01/03/95
01/03/96
01/02/97
01/02/98
01/02/99
01/02/00
01/01/01
01/01/02
01/01/03
01/01/04
Cottonwood MW2
Neversweat MW2

West Ranch Wells
Water Levels



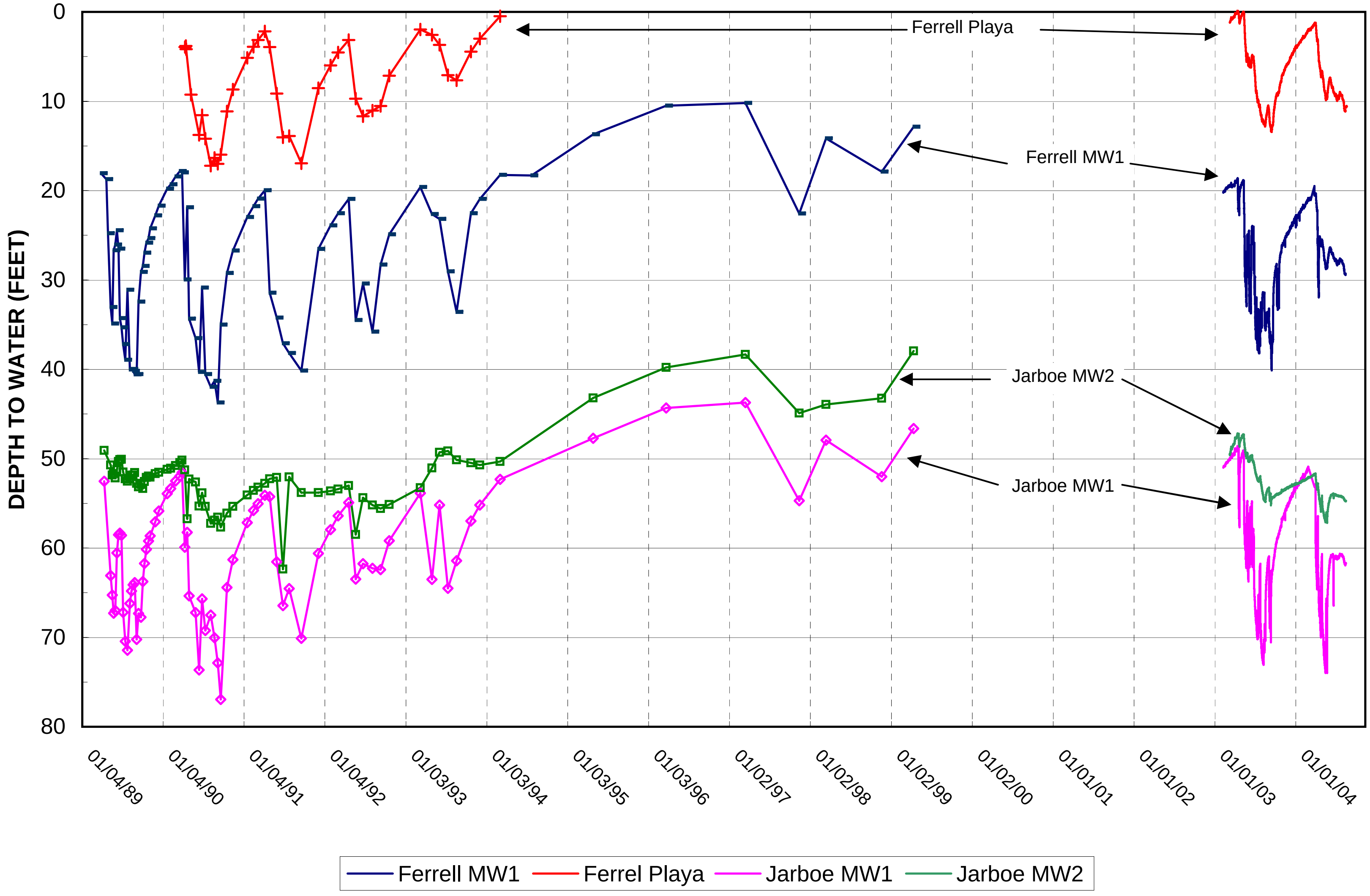

West Ranch Wells
Water Levels
DEPTH TO WATER (FEET)
0
10
20
30
40
50
60
70
80
Ferrell Playa
Ferrell MW1
HQ MW2
Jarboe MW2
Wison MW1
Jarboe MW1
01/04/89
01/04/90
01/04/91
01/04/92
01/03/93
01/03/94
01/03/95
01/03/96
01/02/97
01/02/98
01/02/99
01/02/00
01/01/01
01/01/02
01/01/03
01/01/04
Ferrell MW1
Ferrel Playa
Jarboe MW1
Jarboe MW2
HQ MW2


West Ranch Wells
Water Levels
DEPTH TO WATER (FEET)
20
30
40
50
60
70
80
01/04/89
01/04/90
01/04/91
01/04/92
01/03/93
01/03/94
01/03/95
01/03/96
01/02/97
01/02/98
01/02/99
01/02/00
01/01/01
01/01/02
01/01/03
01/01/04
HQ MW2
HQ MW-1
HQ MW2



West Ranch Wells
Water Levels
DEPTH TO WATER (FEET)
0
10
20
30
40
50
60
70
80
90
100
Ferrell Playa
Ferrell MW1
Wilson MW1
01/04/89
01/04/90
01/04/91
01/04/92
01/03/93
01/03/94
01/03/95
01/03/96
01/02/97
01/02/98
01/02/99
01/02/00
01/01/01
01/01/02
01/01/03
01/01/04
Ferrell MW1
Ferrel Playa
Series12
Wilson MW-1

West Ranch Wells
Water Levels



Barometric Pressure