

**Final Environmental Assessment
And
Finding of No Significant Impact
for
Native Trout Restoration and Enhancement Projects
in Southwest Utah**



**Prepared by
Utah Division of Wildlife Resources
Southern Region Office
Cedar City, Utah**

in cooperation with

Fishlake National Forest
Dixie National Forest
Bureau of Land Management
U.S. Fish and Wildlife Service

August 2007

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Final Environmental Assessment Native Trout Restoration and Enhancement Projects in Southwest Utah

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Abstract

The Utah Division of Wildlife Resources (UDWR), in cooperation with the Fishlake National Forest (NF), the Dixie NF, BLM Richfield Field Office is proposing to establish populations of native trout (Bonneville cutthroat trout or Colorado River cutthroat trout) in ten streams in south central and southwestern Utah. Nonnative trout in project streams would be removed where they are present. Fish migration barriers would be constructed where necessary to prevent the reinvasion of nonnative trout. Native trout from "core" populations or fish produced from UDWR native trout brood stocks would be introduced to establish self-sustaining populations. In addition, nonnative fish would be removed from one marsh area, where they impact waterfowl use and production.

The proposed action is to expand the range and number of populations of native trout within their historic range. The action implements conservation actions listed in conservation agreements and strategies for native trout in Utah. It follows recommendations from the U. S. Fish and Wildlife Service to reduce threats to native trout and provide for the long-term conservation of the species. The proposed action at the marsh area will improve water quality and forage conditions for waterfowl. Improved use by waterfowl will increase hunting, wildlife watching and other recreational opportunities. Actions will be implemented during the period 2007-2011. Specific elements of the project will be implemented in coordination with related land management projects in the associated drainages. This Environmental Assessment documents the analysis of the Proposed Action as well as the "No action" alternative which would result in continuing the existing situation.

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SECTION 1: PURPOSE AND NEED FOR ACTION

1.1 PURPOSE

The primary purpose of the proposed action is to restore, enhance and protect populations of native trout in streams in southwest Utah. One project within the proposed action is to enhance waterfowl habitat in a marsh area.

1.2 NEED FOR ACTION

The American Fisheries Society, a professional society of fisheries scientists, considered the Bonneville cutthroat trout and the Colorado River cutthroat trout as “threatened” throughout their range in 1979 because of habitat degradation, hybridization, and competition with nonnative species. The U. S. Fish and Wildlife Service (FWS), the agency responsible for administering the Endangered Species Act, considered the two subspecies to be candidates for federal listing as threatened or endangered until 1996. The State of Utah classified the two native trout as sensitive species or species of special concern until 1997. Conservation agreements and strategies were developed as a cooperative effort among resource agencies to address threats that might warrant federal listing (Lentsch et al 1997, Lentsch and Converse 1997). Actions outlined in the agreements were implemented between the late 1990’s through 2004 and continued conservation efforts for native trout that had begun in the 1970’s by the UDWR and resource management agencies. The status of Bonneville cutthroat trout was formally reviewed by the FWS in 2001. Following the 2001 review, the FWS found that listing of the Bonneville cutthroat trout as a threatened or endangered species was not warranted at that time, due in part to actions being implemented under the conservation agreement (Federal Register Document 01-24805). Recommendations made to signatory parties following the review included to “continue focusing on...range expansion within native Bonneville cutthroat trout range and restoring connectivity among small, fragmented streams...”. A petition to list Colorado River cutthroat trout was reviewed by the FWS in 2004. They concluded in a “90-day finding” that the petition did not present sufficient information to warrant listing or further consideration (Federal Register Document 04-8633). The FWS did concur with the petitioner that the current range of Colorado River cutthroat trout has been greatly reduced from their historic distribution but noted that “State management efforts....continue to improve the outlook for the Colorado River cutthroat trout.”

Actions outlined in the conservation agreements for the two native trout include reintroduction within their historic range. Reintroduction projects typically involve the removal of non-native trout, construction or enhancement of fish-migration barriers, and transfer of native trout from “core” source populations. These techniques have been instrumental in increasing the number of known native trout populations in southwestern Utah from 3 populations in about 6 miles of stream in 1977 to populations in more than 33 streams and over 93 miles in 2002 (Hepworth et al. 2002). These past treatments have made the status of native cutthroat trout more secure and increased the opportunities for sport fishing for native cutthroat trout. It is important to realize, however, that the vast majority of stream miles in southwestern Utah are still occupied with nonnative trout. Additional treatments are still required to further ensure the long-term security of these native trout. Even after the proposed treatments, opportunities for sport fishing for nonnative rainbow, brook, and brown trout will still be readily available and will still make up the majority of fishing opportunities.

In addition to the proposed reintroductions of native trout, one of the proposed treatments is intended to remove nonnative fish from a marsh area. At the marsh area, carp influence vegetation and water quality and negatively impact use and production by waterfowl.

1.3 DECISIONS TO BE MADE

The decisions to be made from this analysis include (1) whether to remove all fish, including nonnative trout, from project waters listed in 2.1.3 using rotenone; and 2) whether to approve the construction of fish

migration barriers at selected sites. This document also lists which native trout will be introduced into treated waters. Determinations of trout species for reintroduction is a state action which is outside the scope of this document, but is included in this document as an informational item to clarify the overall project plan. The agencies and officers responsible for the decisions are listed below:

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**Douglas Messerly, Regional Supervisor
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Cedar City, Utah**

1.4 REQUIRED PERMITS

A Pesticide Use Proposal must be approved by the Forest Supervisor or District Manager of the appropriate resource management agency prior to implementing individual projects. Stream alterations permits must be approved by the State Engineer and U.S. Army Corp of Engineers for construction of migration barriers associated with the projects.

SECTION 2: PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION, ALTERNATIVES, AND WATERS

2.1.1 Proposed Action

The UDWR proposes to treat 10 streams and one marsh area during the period 2007-2011. Approximately 69 miles of stream and 100 acres of marsh are proposed for treatment. All fish would be temporarily eliminated from target waters. Native trout would be introduced into project streams following treatments to establish self-sustaining populations. Sterile hybrid trout may also be stocked at some locations for a limited period to provide sport-fishing opportunities while native trout become established. In the marsh, all fish would be removed and efforts would be made to keep carp at reduced densities by manipulation of water levels. Finally, the UDWR proposes to construct fish migration barriers on streams where barriers do not currently exist to prevent re-colonization by nonnative fish that have been removed.

Liquid emulsifiable and powder rotenone (Liquid Rotenone, 5% Active Ingredient, EPA Registration No. 432-172; Powder Rotenone, 7.4% Active Ingredient, EPA Registration No. 6458-6) would be used to treat target waters. Liquid Rotenone would be applied at a rate of 0.5 - 3.0 ppm. In ponds liquid rotenone would be dispersed from small water-craft using pressurized backpack spray units. On streams and canals, liquid rotenone would be applied using drip stations over a 3-24 hr period (Finlayson et. al 2000). Drip stations would be located at approximately 0.5 mile intervals. Pressurized backpack sprayers would be used to apply a diluted solution of the chemical to springs and backwater areas containing fish which were not effectively treated by boat or drip station. Rotenone powder may be used in addition to liquid when treating ponds or the marsh area. Powder Rotenone would be applied at 0.5 - 3.0 ppm as a wet slurry by boat or hand. Where necessary, the rotenone would be detoxified with potassium permanganate downstream from target waters to prevent impacts from occurring below the target area. Application of the chemical would be conducted by UDWR and USFS personnel certified as Non-commercial Pesticide Applicators by the Utah Department of Agriculture. Safety gear including rubber gloves, protective coveralls and respirators would be used where appropriate.

Rotenone was selected as the chemical to use because of its effectiveness in controlling fish populations and its lack of long-term effects on the environment (Sousa et al 1987). Rotenone is a naturally occurring fish toxicant that is toxic to only fish, some aquatic invertebrates, and some juvenile amphibians at the concentrations planned for the project. It is not toxic to humans, other mammals, and birds at the concentrations used to remove fish. It has been widely used in the United States since the 1950's. UDWR has used rotenone successfully in many similar projects and has refined application techniques to minimize adverse side effects to the environment.

In general, waters would be treated in the fall to minimize impacts on non-target wildlife species (amphibians, insectivorous birds and bats). The fall treatment period would also minimize the impacts on sport fishing recreation. Where necessary, waters would be treated on successive years to insure complete removal of target species. Approximately two waters would be treated per year, allowing completion of the overall project within five-six years.

Fish-migration barriers will be constructed at the downstream end of project stream reaches where naturally occurring or manmade barriers do not already exist. Barriers will generally consist of small check dams constructed of boulders and large rocks, creating a vertical drop of approximately 5 ft on the downstream side. Locations for barriers will be selected to utilize naturally occurring drops which can be enhanced and where the stream channel and floodplain is confined to minimize the size of the structure and the amount of water impounded behind the check dam/barrier. Where feasible, two barriers will be constructed near the downstream end of project stream reaches to help insure their effectiveness. In some instances, barriers may be created by modifying or enhancing structures such as culverts at stream crossings or diversion structures. All barrier construction will comply with laws, regulations, and permitting requirements of the State Engineer for stream channel alteration. Barrier materials would be

taken from the ground surface, near the stream. The collection of these materials would not require excavation, stream alteration, or vegetation disturbance. If sufficient material is not available on site additional materials will be hauled to the barrier site from an approved source.

Stream barrier locations would be selected to minimize changes in stream gradient, hydraulic function, and water pooling. In addition, barriers would be constructed adjacent to existing roads where equipment access is acceptable, thus requiring little disturbance to surrounding areas. Riparian vegetation would be disturbed as little as possible during the construction of migration barriers, while areas where surface disturbance would occur will be restored to pre-project conditions. Barriers will not be placed in areas of cultural or historic significance, or in areas where sensitive, threatened or endangered plants occur. Migration barriers are designed to operate under the natural fluctuations of a stream flow without routine maintenance. Barrier designs pose little, if any, threat to the natural stream system or its associated riparian area. Consequently, if a barrier failed no damage would result to the stream environment. Maintenance could include the adjustment or replacement of individual rock materials, but such work would be minor.

Following the second rotenone treatment and construction of fish migration barrier(s), native trout will be introduced into project stream reaches from "core" populations or from fish produced by UDWR native trout brood stocks. Sterile hybrids of species of nonnative trout may also be stocked at some locations following the treatments to provide sport fishing opportunities while native trout become established. All transfers or stocking of fish will comply with Utah State Department of Agriculture rules and UDWR policies.

One marsh area will be treated with rotenone to remove carp. All fish will be removed by the treatment. Treated waters would remain open to fishing. All treatments will be preceded by news releases in local papers to notify the public of treatment sites and dates.

Projects will be implemented during the period 2007-2011.

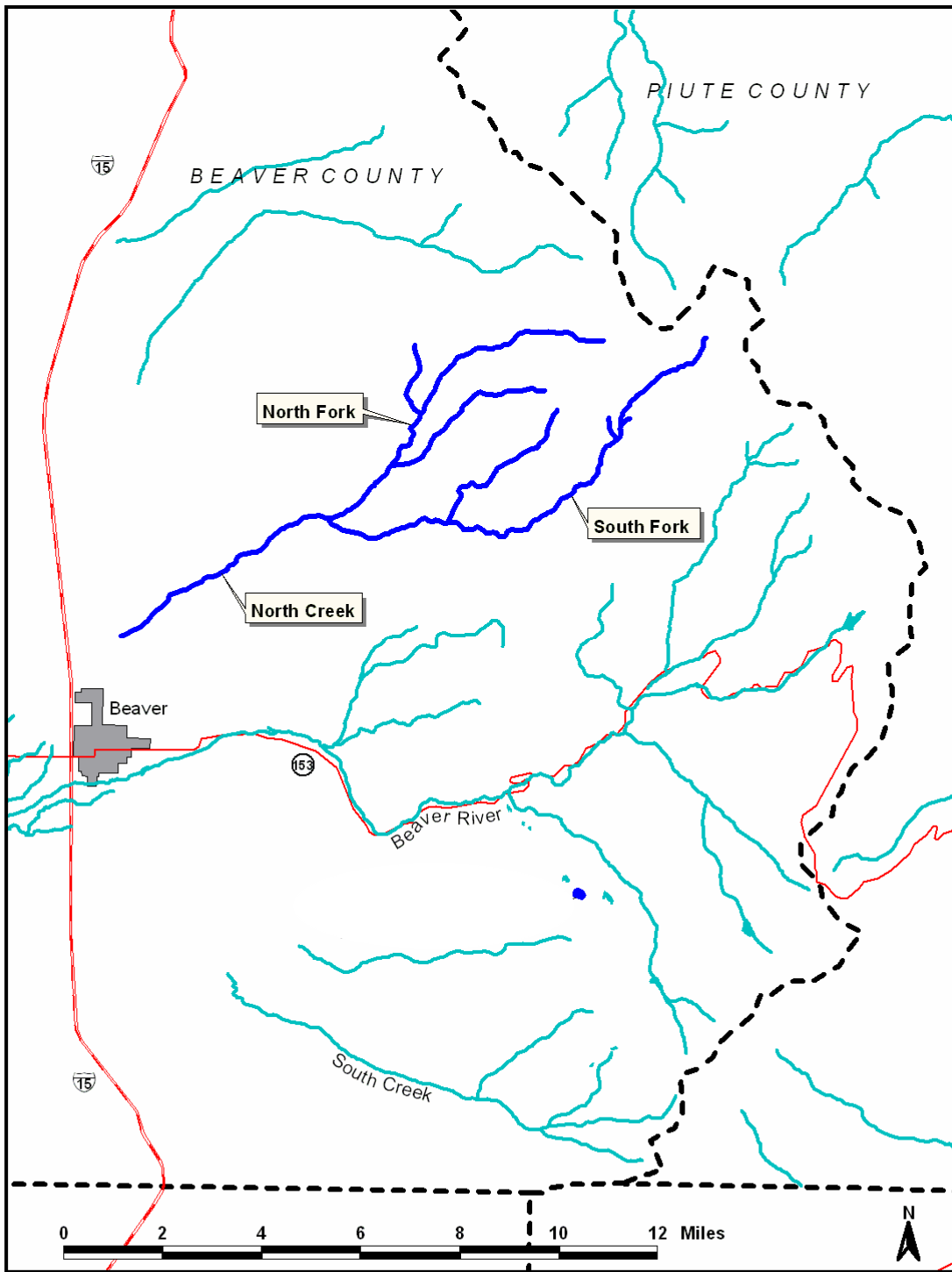


Figure 1. Map showing location of North Creek, Beaver County.

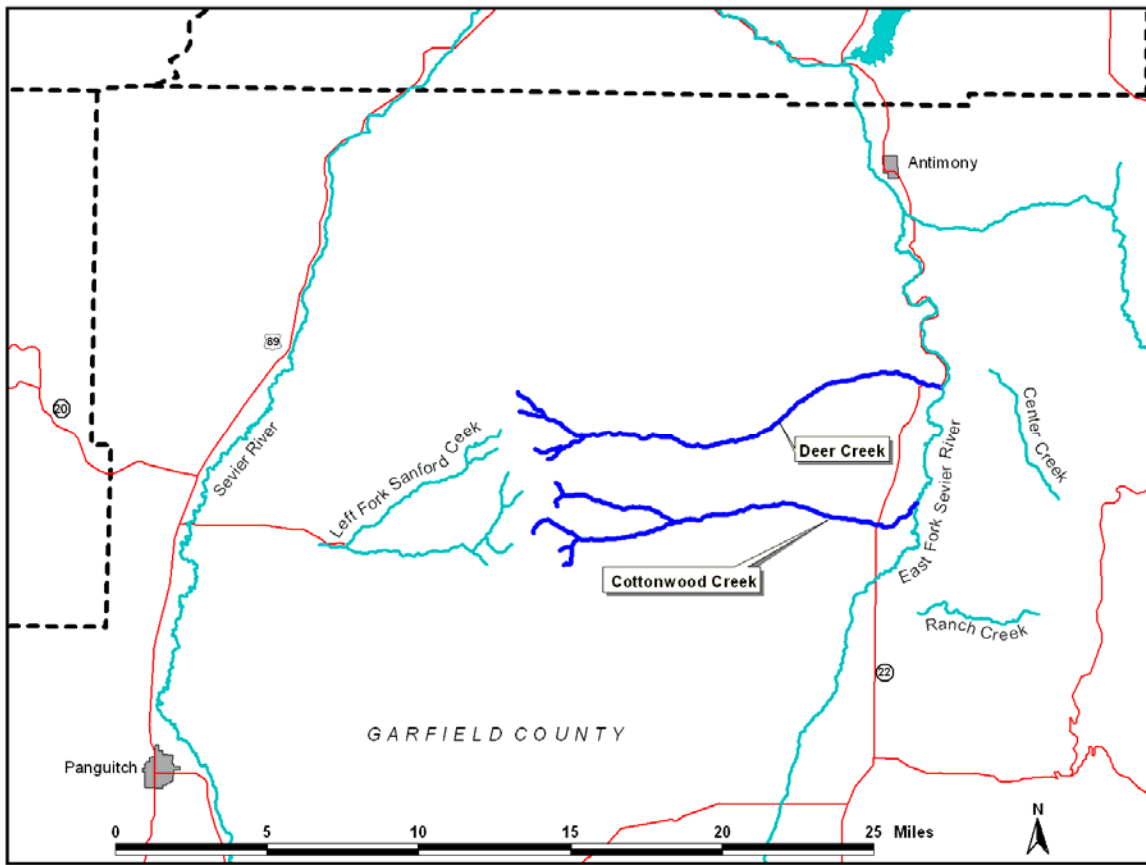


Figure 2. Map showing location of Cottonwood Creek and Deer Creek, Garfield Co.

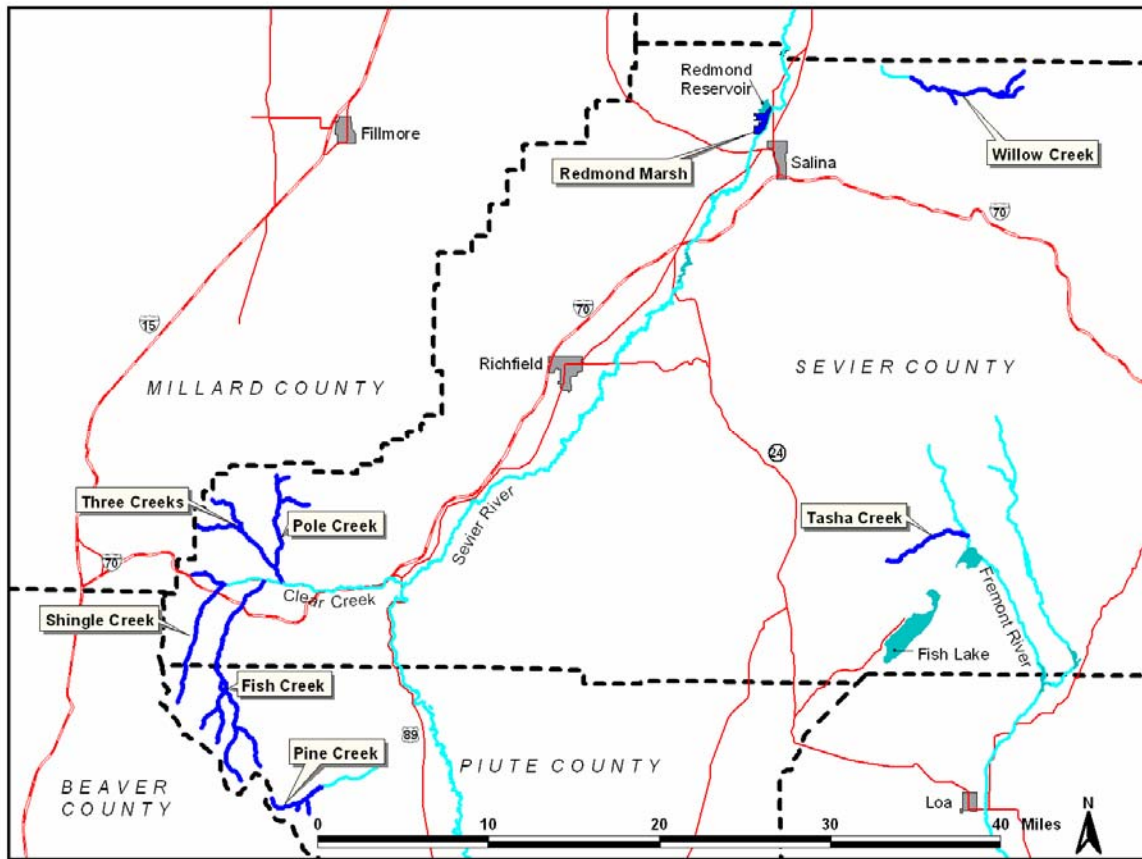


Figure 3. Map showing location of proposed projects in Sevier Co. and Piute Co.

2.1.2 No Action (Current Conditions)

The "No Action" alternative would maintain current conditions. Law mandates its consideration in the analysis. Under this alternative, the current status of the waters would continue. Species composition of fisheries would remain similar to what is now present. No increase in native trout populations or habitat would occur and, under the No Action Alternative, no progress would be made toward meeting the primary objective of the project. The lack of continued progress in restoring and securing these native fish would make them more vulnerable to being listed as a threatened species under the Endangered Species Act. Numbers of nonnative carp in the marsh area would not be reduced and waterfowl production would not be improved.

2.1.3 Proposed Waters

The following waters are proposed for chemical treatment. Native trout would be stocked or transferred to all streams to establish self-sustaining populations following the treatment. Carp would be removed from the marsh area to enhance waterfowl habitat. All of these waters have been surveyed prior to proposed treatments. Maps showing specific project locations are located in Appendix A.

Water Name	Location	Approx stream length / Reservoir area	Target species / Comment	Objective
Cottonwood Creek	T 33S, R 21/2W Garfield Co.	2 miles	NA / Stream is likely fishless and rotenone treatment may not be required. Barrier construction may be necessary.	Establish Bonneville cutthroat trout
Deer Creek	T 32S, R 21/2W Garfield Co.	14 miles	Rainbow trout, nonnative cutthroat trout, brown trout. / Barrier construction may be necessary.	Establish Bonneville cutthroat trout
Fish Creek	T 26S, R 5W, Piute Co., Sevier Co.	14 miles	Rainbow trout, brown trout. / Barrier construction may be necessary.	Establish Bonneville cutthroat trout
North Creek	T 28S, R 5&6W Beaver Co.	16 miles	Rainbow trout, brown trout. / North Fk of North Cr contains native trout already. Project will remove nonnative trout from lower portion of North Fk and all of South Fk, followed by reintroduction of native trout.	Establish Bonneville cutthroat trout
Pine Creek (Bullion Canyon)	T28S, R4W Piute Co.	4 miles	Nonnative cutthroat trout. Target area is from Bullion Falls (natural barrier) to headwaters.	Establish Bonneville cutthroat trout.
Pole Canyon / Three Creeks	T 25S, R 5W Sevier Co.	12 miles	Rainbow trout. / Barrier construction will be necessary.	Establish Bonneville cutthroat trout
Redmond Marsh	T 26S, R 5&6W Sevier Co.	100 acres	Carp. / Does not include Redmond Reservoir.	Enhance waterfowl habitat.
Shingle Creek	T 26S, R 5&6W Piute C., Sevier Co.	9 miles	Rainbow trout, brown trout. / Barrier construction will be necessary. Treatment would occur in conjunction with treatment of upper Clear Creek.	Establish Bonneville cutthroat trout

Tasha Creek	T 25S, R 2E Sevier Co.	5 miles	Brook trout. / Barrier construction will be necessary.	Establish Colorado River cutthroat trout
Willow Creek	T 21S, R 2E Sevier Co.	3 miles	Rainbow trout, RT X CT hybrids. / Project to expand small remnant population in headwaters if genetics testing confirms purity.	Expand population of Bonneville cutthroat trout
Upper Clear Creek	T 25S, R5W	2 miles	Rainbow trout and brown trout. / Barrier construction would be necessary. Target area is section above confluence with Shingle Creek. To be treated in conjunction with Shingle Creek.	Establish Bonneville cutthroat trout

2.2 ALTERNATIVES CONSIDERED BUT NOT ANALYZED FURTHER

2.2.1 Other Fish Removal Methods

Physical removal by electrofishing, gillnetting, or seining are common techniques used to collect fish and sample populations. They are, however, labor intensive, and it is not practical to capture all fish necessary for a removal program (California Department of Fish and Game 1983). Consequently, this method of capture and removal of fish is not effective enough to insure that nonnative fish would be completely removed and would not re-colonize treated waters. This alternative would not meet the purpose and need for the project, which is to establish pure populations of native species.

2.3 DIRECTION FROM STATE AND FEDERAL PLANNING DOCUMENTS

The proposed actions are in agreement with direction provided by the Fishlake National Forest Land and Resource Management Plan (FNFLRMP) and the Dixie National Forest Land and Resource Management Plan (DNFLRMP). Goals listed for wildlife and fish in the FNFLRMP include: coordinate wildlife and fish habitat management with State, other Federal and local agencies; identify and improve habitat for sensitive, threatened and endangered species including participation in recovery efforts for both plants and animals. DNFLRMP goals for wildlife and fish include: coordinating fish and wildlife programs with UDWR; manage Bonneville cutthroat trout and Colorado River cutthroat trout habitat to maintain or enhance their status through direct habitat improvement and agency cooperation; give priority to structural habitat improvement work for Bonneville cutthroat trout.

The proposed actions are also in agreement with direction provided by both the Conservation Agreement and Strategy for Bonneville Cutthroat Trout (*Oncorhynchus clarki utah*) (Lentsch et al 1997), and the Conservation Agreement and Strategy for Colorado River Cutthroat Trout (*Oncorhynchus clarki pleuriticus*) (Lentsch and Converse 1997). Both documents list the control of nonnative species and the expansion of native cutthroat as conservation actions necessary to meet the goals and objectives of the agreements. Signatories to these conservation agreements include the Forest Service, Bureau of Land Management, U. S. Fish and Wildlife Service, and UDWR.

Finally, the proposed actions are in agreement with UDWR Aquatic Management Plans (AMPs) and draft AMPs for the Sevier River, East Fork Sevier River, Beaver River, and Freemont River drainages. These AMPs list the negative impacts of nonnative species as biological issues to be addressed in the listed drainages. In addition, the AMPs cite nonnative fish eradication, barrier construction, and native trout introduction as solutions or management strategies that could resolve these management issues.

Some of the proposed work is contingent upon the status of the Bonneville cutthroat trout and Colorado River cutthroat trout with respect to federal listing. Any change from the two subspecies' current unlisted status to threatened or endangered will preclude implementation of projects. The description of the Proposed Action gives the general procedures, which would be followed for all of the target waters. Implementation dates for specific projects would depend upon water conditions, obtaining the appropriate

permits, and funding availability.

2.4 PUBLIC INVOLVEMENT

The scoping process included notification of state, federal, and local agencies in 2003. The proposed projects were explained to the Beaver County, Garfield County, and Sevier County Commissioners at their regular scheduled meetings during 2003. An application describing the proposed action was sent to the State Resource Development Coordinating Committee, which includes review by the Six County Commissioners Organization and the Five County Association of Governments. These associations include representatives of the counties included in the project area as well as counties in the surrounding areas.

A legal notice describing the project was published in the Spectrum (St. George) on June 4, 2004 and the Richfield Reaper on May 26, 2004. These notices requested suggestions for issues to be addressed in the project analysis. Public comments were requested within a 30-day period following the publications. In addition, a scoping letter was sent to over 140 individuals whose names were provided by the various land management agencies responsible for the decisions. Documentation of the publications and a record of responses are in the Project File located at the Southern Region Office, UDWR.

2.5 ISSUES

Six letters of response and one phone call were received during or shortly following the scoping period. Based upon input received during the scoping process, and input received during similar projects in the past, seven issues were raised as follows:

1. Use of rotenone and activity associated with the projects could adversely impact non-target wildlife and plants including fish, amphibians, insects and birds.
2. Use of rotenone could contaminate drinking water supplies.
3. Removal of nonnative trout will have an impact on sportfishing opportunities in the target areas.
4. Federal listing of native trout may impact other resource uses in the project areas.
5. Use of rotenone and project activities could harm livestock or result in a change in land management that could result in a reduction of livestock use.
6. Construction of migration barriers may impact roadless areas, the undeveloped characteristics of the area, and endangered plants.
7. Construction of migration barriers may negatively impact historical, cultural, or archeological sites.

SECTION 3: AFFECTED ENVIRONMENT

This section describes the current status of only those resources within the project area, which may be affected by the proposed management activities. Those resources that warrant a cumulative effects analysis include a section that describes the cumulative effects area and past, present, and future management activities that will be included in the analysis.

3.1 FLOODPLAINS/WETLANDS

The proposed treatments would take place within floodplains and wetlands of the project areas listed in Section 2.1.3. The wetlands are generally confined to a small area adjacent to the lakes and streams. There are also a number of springs and seeps associated with the various projects.

The cumulative effects area, for analysis purposes, will be the proposed project areas. Past, present and foreseeable activities which may have a cumulative effect on flood plains and wetlands are listed in Appendix D.

3.2 WATER QUALITY

The Utah Department of Environmental Quality designations (1997 revised) for the Project Area waters are listed below.

WATER	CATEGORY *	USE CLASS *
Cottonwood Creek (East Fork Sevier River)	Category 1	2B, 3A, 4
Deer Creek (East Fork Sevier River)	Category 1	2B, 3A, 4
Fish Creek (Sevier River)	Category 1	2B, 3A, 4
North Creek (Beaver River)	Category 1	2B, 3A, 4
Pine Creek / Bullion Canyon (Sevier River)	Category 1	2B, 3A, 4
Pole Canyon / Three Creeks (Sevier River)	Category 1	2B, 3A, 4
Redmond Marsh (Sevier River)	Category 1	2B, 3A, 4
Shingle Creek (Sevier River)	Category 1	2B, 3A, 4
Tasha Creek (Fremont River)	Category 1	2B, 3A, 4
Willow Creek (Sevier River)	Category 1	2B, 3A, 4
Upper Clear Creek (Sevier River)	Category 1	2B, 3A, 4

* High Quality Waters -
Category 1 = Waters of high quality which have been determined by the Board to be of exceptional recreational or ecological significance or have been determined to be a State or National resource requiring protection.

Class 2B = Protected for secondary contact recreation such as boating, wading, or similar uses.
Class 3A = Protected for cold water species of game fish and other cold water aquatic life.

Class 4 = Protected for agricultural use including irrigation of crops and stock watering.

The cumulative effects area for analysis purposes will be the proposed project area. Past, present, and foreseeable activities which may have a cumulative effect on water quality are listed in Appendix D.

3.3 RECREATION

Waters in the Project Area receive varying amounts of recreational use. Most of the target waters receive limited fishing pressure. Other activities that occur in the project area include hunting, hiking, ATV riding, camping, sight-seeing and wildlife viewing. The table below gives the relative amount of recreational use at the waters, facilities available at each location and other information related to recreational use. The recreational use ratings are based upon personal observations of field personnel.

WATER	RECREATION	FACILITIES	COMMENTS
Cottonwood Creek (East Fork Sevier River)	Low	No developed facilities.	Fishery is limited by small size of stream. Nonnative trout that were present have been eliminated by impacts of the 2002 Sanford Fire.
Deer Creek (East Fork Sevier River)	Low	No developed facilities.	Access is limited. Nonnative trout fishery was reduced by impacts of the 2002 Sanford Fire.
Fish Creek (Sevier River)	Low	No developed facilities.	Limited access.
North Creek (Beaver River)	Moderate	No developed camping facilities. Instream fish habitat structures and fish migration barrier have been constructed by USFS on the North Fork.	Good access along most of the North Fork. Access along most of the South Fork is limited to trail.
Pine Creek / Bullion Canyon (Sevier River)	Moderate	Miners Park, including picnic area is located below the treatment area.	Access to section proposed for establishing native trout population is limited to trails.
Pole Canyon / Three Creeks (Sevier River)	Low	No developed facilities.	Limited access.
Redmond Marsh (Sevier River)	Low	No developed facilities.	Recreational use is primarily waterfowl hunting and wildlife viewing.

Shingle Creek (Sevier River)	Low	No developed facilities.	Access along most of stream is limited to trails.
Tasha Creek (Fremont River)	Moderate	No developed facilities.	Access limited to trail.
Willow Creek (Sevier River)	Low	No developed facilities.	Secondary road access to most of stream. Fishery limited by small size of stream.
Upper Clear Creek (Sevier River)	Low	No developed facilities.	Accessible by paved highway. Fishery limited by small size of stream.

The cumulative effects area for analysis purposes is the southwestern part of the state. Past, present, and foreseeable activities which may have a cumulative effect on recreation are listed in Appendix D.

3.4 FISHERIES

The fisheries present in the Project Area waters are listed below. Estimates of the relative abundance of individual species are given. Most of these waters were stocked at some time in the past with nonnative trout. Waters where nonnative trout are still present have been maintained by natural reproduction of the species listed.

WATER	SPECIES PRESENT*	RELATIVE ABUNDANCE	COMMENTS
Cottonwood Creek (East Fork Sevier River)	None likely at present time. CTSB prior to Sanford Fire.	Limited prior to Sanford Fire	Nonnative trout that were present prior to the Sanford Fire are assumed to have been extirpated. The former self-sustaining population was limited by small size of stream.
Deer Creek (East Fork Sevier River)	CTSB RT BNT MSC MTS SPD	Limited Limited Limited Limited Limited	Fish listed were greatly reduced in number by the 2002 Sanford Fire. Current populations are restricted to the lower reach of Deer Creek.
Fish Creek (Sevier River)	RT BNT MSC SD MTS	Abundant Abundant Common Limited Limited	

North Creek (Beaver River)	CTBV MSC	Common Common	Current population of Bonneville cutthroat trout in the lower portion of the drainage shows some signs of introgression with rainbow trout.
Pine Creek / Bullion Canyon (Sevier River)	CTSB RT CTBV	Common Low Common	CTSB and RT have been stocked in the past and have established reproducing populations. CTBV have been stocked in the headwater reach in recent years.
Pole Canyon / Three Creeks (Sevier River)	RT RTxCT CTBV	Abundant Abundant Limited	The stream is dominated by RT and RTxCT hybrids. A small population of CTBV may remain in the headwater reaches.
Redmond Marsh (Sevier River)	CP FM GSF LCB MF	Abundant Abundant Low Low Low	
Shingle Creek (Sevier River)	RT RTxCT MSC	Abundant Limited Common	The stream dominated by rainbow trout. Some RTxCT hybrids occur in the upper portion of drainage.
Tasha Creek (Fremont River)	BKT	Abundant	
Willow Creek (Sevier River)	CT RT	Common	The stream is dominated by RT and RTxCT hybrids. A small population of CTBV may remain in the headwater reaches.
Upper Clear Creek (Sevier River)	RT BN MSC MTS SPD	Limited Limited Common Common Common	Intermittent flow limits RT and BN distribution. Only areas found to contain RT and BN would need to be treated, reducing impacts to non-game fish.

- * BKT = Brook trout *Salvelinus fontinalis*
 BNT = Brown trout *Salmo trutta*
 CP = Common carp *Cyprinus carpio*
 CTSB = Strawberry Cutthroat trout = Cutthroat trout cultured by UDWR and widely distributed prior to the 1990's. This stock originated from Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri* but has been introgressed with Colorado River cutthroat trout *O. c. pleuriticus* and rainbow trout
 FM = Fathead minnow *Pimephales promelas*
 GSF = Green sunfish *Lepomis cyanellus*
 LCB = Leatherside chub *Gila copei*
 MF = Mosquito fish *Gambusia affinis*
 MSC = Mottled sculpin *Cottus bairdi*
 MTS = Mountain sucker *Catostomus platyrhynchus*
 RT = Rainbow trout *Oncorhynchus mykiss*
 SPD = Specked dace *Rhinichthys osculus*

The cumulative effects area for analysis purposes is the proposed project area. Past, present, and foreseeable activities which may have a cumulative effect on fisheries are listed in Appendix D.

3.5 WILDLIFE

Numerous species of wildlife utilize the waters in the Project Area and the riparian areas associated with them. Aquatic species, besides fish, which are susceptible to rotenone and directly impacted by the

proposed treatment, include some aquatic invertebrates and juvenile amphibians. The following is a list of amphibians which may occur in the project area: Tiger salamander, northern leopard frog, Boreal chorus frog, and western (boreal) toad. The American dipper and a variety of species of neotropical birds and bats which utilize aquatic invertebrates for food may also be present in the project area. Many of these species are present only seasonally in southern Utah. Additional species of wildlife are discussed in Sections 3.7 and 3.8.

The cumulative effects area for analysis purposes is the proposed project area. Past, present, and foreseeable activities which may have a cumulative effect on wildlife are listed in Appendix D.

3.6 THREATENED, ENDANGERED, AND PROPOSED SPECIES

The following species are listed by county as threatened (T), endangered (E), or candidate (C) species according to the FWS under the federal Endangered Species Act of 1973, as amended, that may occur within the area of influence of the proposed action.

COMMON NAME	SCIENTIFIC NAME	STATUS
BEAVER COUNTY		
Bald Eagle	<i>Haliaeetus leucocephalus</i>	T
California Condor	<i>Gymngyps californianus</i>	E
Western Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	C
Utah Prairie Dog	<i>Cynomys parvidens</i>	T
GARFIELD COUNTY		
Aquarius Paintbrush	<i>Castilleja aquariensis</i>	C
Autumn Buttercup	<i>Ranunculus aestivalis</i>	E
Jones Cycladenia	<i>Cycladenia humilis var. jonesii</i>	T
Maguire Daisy	<i>Erigeron maguirei</i>	T
Ute Ladies'-tresses	<i>Spiranthes diluvialis</i>	T
Bald Eagle	<i>Haliaeetus leucocephalus</i>	T
California Condor	<i>Gymngyps californianus</i>	E
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	T
Western Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	C
Utah Prairie Dog	<i>Cynomys parvidens</i>	T
PIUTE COUNTY		
Bald Eagle	<i>Haliaeetus leucocephalus</i>	T
Western Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	C
Utah Prairie Dog	<i>Cynomys parvidens</i>	T
SEVIER COUNTY		
Heliotrope Milkvetch	<i>Astragalus montii</i>	T
Last Chance Townsendia	<i>Townsendia aprica</i>	T
Wright Fishhook Cactus	<i>Sclerocactus wrightiae</i>	E
Bald Eagle	<i>Haliaeetus leucocephalus</i>	T
Western Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	C
Utah Prairie Dog	<i>Cynomys parvidens</i>	T

The cumulative effects area for analysis purposes is the proposed project area. Past, present, and foreseeable activities which may have a cumulative effect on threatened and endangered species are listed in Appendix D.

3.7 STATE SENSITIVE SPECIES, U.S. FOREST SERVICE SENSITIVE SPECIES

The UDWR has compiled a Utah Sensitive Species List to identify those species in the state that are most vulnerable to population and/or habitat loss. This list is intended to stimulate management actions, e.g., development and implementation of a conservation strategy, for listed species. By developing and implementing timely and sufficient conservation measures for Sensitive Species, federal listing of these species under the Endangered Species Act may be precluded. State Sensitive Species which occur or may occur in the project area are listed in Appendix A. That Appendix also lists species that may occur or have suitable habitat in the area which have been designated as Sensitive Species by the Regional Forester. Some of these species may use the riparian habitat in the project area or forage on invertebrates associated with the project waters.

The cumulative effects area for analysis purposes is the proposed project area. Past, present, and foreseeable activities which may have a cumulative effect on species at risk and sensitive species are listed in Appendix D.

3.8 MANAGEMENT INDICATOR SPECIES

The National Forest Management Act, 1976, required National Forests to select a group of representative fish and wildlife species whose populations could be monitored relatively easily. Response of these species to management activities is used as an indicator of effects on other species occupying similar habitat. The Fishlake National Forest established two groups of Management Indicator Species (MIS) in the LRMP, one as ecological indicators and another to represent species of high interest. Goshawk, 3 species of cavity-nesting birds (hairy woodpecker, western bluebird, and mountain bluebird), 4 species of riparian dependent birds (Macgillivray's warbler, yellow warbler, Lincoln's sparrow, and song sparrow), 3 species of sage-nesting birds (Brewer's sparrow, vesper sparrow, and sage thrasher) resident trout (brown, brook, cutthroat, rainbow trout) and macroinvertebrates are the MIS present in the project area. Bonneville cutthroat trout, mule deer and elk were designated as high interest MIS in the LRMP. MIS selected by the Dixie National Forest include those same groups, as well as wild turkey. In Section 4, Elk, deer, and birds are discussed under Wildlife (Part 4.5), trout are discussed under Fisheries (Part 4.4) and aquatic macroinvertebrates are discussed under Water Quality (Part 4.2) and Wildlife (Part 4.5).

Information concerning life histories, suitable habitats, threats, ecology, and summarized population trend/monitoring information for the management indicator species of the Fishlake and Dixie National Forests can be found within the *Life History and Analysis of Endangered, Threatened, Candidate, Sensitive, and Management Indicator Species of the Fishlake National Forest, Version 4.0* (Rodriguez 2005) and *Life History and Analysis of Endangered, Threatened, Candidate, Sensitive, and Management Indicator Species of the Dixie National Forest, Version 4.0* (Rodriguez 2004). These documents are incorporated here by reference.

The cumulative effects area for analysis purposes is the proposed project area. Past, present, and foreseeable activities which may have a cumulative effect on MIS are listed in Appendix D. Cumulative effects for trout are discussed under Fisheries (Part 4.5) and aquatic macroinvertebrates are discussed under Water Quality (Part 4.2) in Section 4.

3.9 GRAZING

The project area includes grazing allotments administered by the USFS and BLM. The streams are used as a water source by livestock on the allotments. Riparian vegetation in parts of the project area is also used for forage by livestock.

The cumulative effects area for analysis purposes are the grazing allotments associated with the project area. Past, present, and foreseeable activities which may have a cumulative effect on grazing are listed in Appendix D.

3.10 CULTURAL RESOURCES

Cultural and historical resources in the restricted areas where migration barriers are tentatively planned have not been determined, but would likely be limited to small artifacts. The type of sites selected for the barriers (narrow rocky canyons), the small size of the disturbance, and the dynamic nature of the streambed itself make the presence of artifacts highly unlikely. Any sites that might be present would likely be limited to small artifacts of limited cultural value. Sites where barriers will be constructed will be evaluated for historical or cultural resources prior to construction in accordance with Utah Code 9-8-404.

3.11 PUBLIC HEALTH AND SAFETY

The project area waters are used by the public for recreational purposes. They are also used for stock watering and for downstream irrigation. In addition, three of the waters within the Project Area are within watersheds used for municipal purposes or domestic water sources, including Pine Cr / Bullion Canyon, Clear Creek and North Creek. The cumulative effects area for analysis purposes is the project area. Past, present, and foreseeable activities which may have a cumulative effect on public health and safety are listed in Appendix D.

SECTION 4: ENVIRONMENTAL CONSEQUENCES

The format of this section will be to describe the direct and indirect effects of each alternative by resource. Cumulative effects will be discussed in a separate section (section 4.11). For each resource, the effects of Alternative 1 (No Action) will be discussed first, followed by a discussion of effects of the Proposed Action (rotenone treatment).

4.1 FLOODPLAINS/WETLANDS

4.1.1 No Action – Direct and Indirect Effects

The No Action Alternative would have no direct or indirect effects on wetlands or floodplains.

4.1.2 Proposed Action - Direct and Indirect Effects

There would be no filling or obstruction of floodplains or wetlands during the proposed treatments. Rotenone does not effect aquatic or riparian vegetation. Small pools will be created by migration barriers to be installed as part of the project at some locations. Compliance with regulations governing alteration of stream channels, including approval from the State Engineer and Army Corps of Engineer, will be obtained prior to construction of the barriers.

4.2 WATER QUALITY

4.2.1 No Action - Direct and Indirect Effects

There would be no direct or indirect, effects to water quality at the project waters under the No Action Alternative. Rotenone would not be used to treat the project area waters. None of the Beneficial Uses designated for waters in the project area would be affected.

4.2.2 Proposed Action – Direct and Indirect Effects

There would be short-term direct effects to water quality as a result of the chemical treatment with rotenone. The primary direct effect would be the toxicity of rotenone to aquatic organisms including fish and invertebrates. Rotenone dissipates in flowing waters relatively rapidly (often less than 24 hours) due to dilution and increased rates of hydrolysis and photolysis (Finlayson et. al 2000). In standing water, toxic effects may occur up to for 4 - 5 weeks depending upon temperature (Bradbury 1986). Numbers of aquatic invertebrates important to the aquatic ecosystem would be temporarily suppressed. Areas upstream from the target waters or refugia left in the fishless portions of target waters would provide a source for rapid recolonization. Off-stream ponds, bogs, seeps and springs would be left untreated, serving as refugia for aquatic invertebrates. This would help insure the recolonization of the treated portions of the streams. The natural, downstream drift of aquatic insects generally results in the rapid recolonization of streams following their removal by natural or man-made events (Hynes 1972). Most or all of the invertebrate species would repopulate the treated area within one or two years (California Dept Fish and Game 1994). In the Strawberry River drainage, where the target concentration of rotenone was greater than that planned for the project area, and where an attempt was made to treat all water in the drainage, about 75% of the number of species present before the treatment had recovered after 3 years (Dr. Fred Mangum, USFS Intermountain Region Aquatic Ecosystem Lab, pers. comm., 1995).

Whelan (2002) reviewed the effects of the 1995 and 1996 rotenone treatments on Manning Creek, Utah. The Manning Creek treatment had lower target concentrations of rotenone and lower application times than the Strawberry treatment studied by Mangum. Whelan (2002) indicated that leaving fishless stream reaches untreated and using the minimum rotenone concentration and treatment time necessary to

achieve the objectives of trout removal were reasonably effective mitigation measures to speed aquatic macroinvertebrate recovery, when compared to the Strawberry treatment. The majority of taxa recovered and was found in the post-treatment samples. Interestingly, many taxa were only found post-treatment. Finally, while a few individual taxa were not found post-treatment, Whelan (2002) noted "there were almost as many taxa found in 1988 and 1990 that were missing by 1995 [immediately] prior to the treatment, as there was taxa found in 1995 that were still missing in 1999 after the treatment".

Engstrom-Heg et al. (1978) conducted a laboratory study of the rotenone tolerance of aquatic macroinvertebrates. They felt that a treatment of less than 10 ppm-hours would generally result in only mild and temporary damage to the aquatic macroinvertebrate community. This is a somewhat lower treatment level than the Manning Creek treatment was, but is within the general application rate and time of rotenone treatments conducted in recent years in Southern Utah since the Manning Creek treatment. During collections of aquatic macroinvertebrate samples from Pine Creek in southern Utah only 5 days following a rotenone treatment at this lowest application level many live aquatic macroinvertebrates were found.

Whelan (2002) reviewed aquatic macroinvertebrate literature for both rotenone treatments and natural disturbances. He found that aquatic macroinvertebrate responses to natural events were often similar to rotenone treatments. Natural disturbances faced by macroinvertebrates in the project area include snowmelt runoff and flooding, drought, monsoon season thunderstorm flood events, and wildfire. Floods can result in major movement of the streambed, greatly affecting macroinvertebrate population levels by scouring and deposition. Aquatic macroinvertebrates were essentially absent for months in Deep Creek following the Sanford fire. Rotenone treatments at low concentrations for short treatment times are likely less impacting to aquatic macroinvertebrates than major natural events. Whelan (2002) summarized mechanisms that aquatic macroinvertebrates have evolved to live in dynamic environments that make them potentially able to survive or persist through rotenone treatments. These include resistant egg stages, multiple overlapping generations, life stages that live deep in the in the gravel of the stream (hyporheic zone) with upwelling groundwater, life stages that live in silt or aquatic vegetation that binds up rotenone, and dispersal by winged adults from areas of refugia. Some taxa, especially those with low oxygen requirements, are relatively resistant to rotenone even as nymphs or adults.

Rotenone is non-toxic to mammals, including humans. At the concentrations used to kill fish, it has been estimated that a 132-lb person would have to consume over 60,000 liters of treated water at one sitting to receive a lethal dose (Sousa et al, 1987). Using a safety factor of 1,000X and the most conservative safe intake level, a person could still drink 14 liters of treated water per day. In addition, extensive testing has not shown rotenone to be carcinogenic (Bradbury 1986). Even though rotenone has been shown to be safe to humans, as a matter of policy, the EPA does not set tolerances for pesticides in potable water. At the same time, the EPA has exempted rotenone from tolerance requirements when applied intentionally to raw agricultural commodities. The State of California (1994) and the National Academy of Science (1983) have computed "safe" levels of rotenone in drinking water that are roughly equivalent to the detection level of rotenone in water (0.005 ppm pure rotenone). Municipal drinking water supplies have been treated with rotenone in at least seven states including Utah. In some cases, rotenone treatment has been used to protect or improve drinking water quality (Hoffman and Payette 1956; Barry 1967).

The mobility of rotenone in soil is low. In fact, the leaching distance of rotenone is only 2 cm in most types of soils. This is because rotenone is strongly bound to organic matter making it unlikely that it would enter ground water. At the same time, rotenone breaks down quickly into temporary residues that would not persist as pollutants of ground water. Ultimately rotenone breaks down into carbon dioxide and water.

A secondary indirect effect of the treatment would be a temporary increase in the nutrient input to the water as a result of decomposition of fish that are killed. This effect would occur for a period of approximately 2 weeks while decomposition occurred. However, natural mortality has always occurred in the target waters and the increase would be negligible with respect to the ecosystem. Some of the nutrients would likely be rapidly assimilated by rebounding aquatic macroinvertebrate populations.

The EPA approves rotenone for the use intended in this project and it would be applied according to label instructions by personnel certified as Non-Commercial Pesticide Applicators. Changes in water quality during the project would not impair other uses. Rotenone will not affect plants and would still be of suitable quality for use by livestock, other mammals and birds.

Potassium permanganate would be used to detoxify rotenone during treatments at some of the project waters. Potassium permanganate would degrade to nontoxic, common compounds within an hour of application at the concentrations that would be used. The detoxification is not immediate in space, but requires a short mixing zone where the potassium permanganate is in contact with and oxidizes the rotenone. Below this mixing zone both fish and aquatic macroinvertebrates would survive.

Drinking water supplies would not be affected by the use of potassium permanganate because it rapidly breaks down into potassium, manganese, and water. In addition, no target streams are used directly as municipal or culinary water sources.

There would be a temporary increase in turbidity immediately downstream from barrier construction sites. The increase would be limited to a short reach directly below the construction site and be limited in duration to the construction period (8-12 hours).

4.3 RECREATION

4.3.1 No Action - Direct and Indirect Effects

There would be no direct or indirect effects to recreation under the No Action Alternative. Recreational opportunities would remain similar to what is currently present. There would be no increase in opportunities to fish for native trout in project waters.

4.3.2 Proposed Action - Direct and Indirect Effects

Since one of the recreational activities at most of the project waters is fishing or fishing related camping and hiking, there would be a short-term impact to recreation under the Proposed Action Alternative. Fishing opportunities and success at most waters would be reduced during the rotenone treatment periods and, where limited numbers of only native trout are introduced, for several years following the chemical treatments. At some streams sterile hybrid trout may be stocked to shorten that period to one or two years. In the long term, there would be increased opportunities to fish for native trout once those populations became established.

4.4 FISHERIES

4.4.1 No Action - Direct and Indirect Effects

Under the No Action Alternative, species composition of project fisheries would remain similar to what is now present at project waters. Nonnative trout would remain the dominant species in these streams. Nonnative carp would continue to dominate Redmond Marsh. No increase in native trout habitat would occur and, under the No Action Alternative, no progress would be made toward meeting the primary objective of the project.

4.4.2 Proposed Action - Direct and Indirect Effects

Under this alternative, all fish in the treated portions of the project areas would be removed by application of rotenone. With the exception of Redmond Marsh, native cutthroat trout would be established in project waters. At some waters, sterile hybrids (tiger trout; brown trout x brook trout) may also be stocked during the initial years following the treatments. In addition, fish migration barriers would be constructed on streams where barriers do not currently exist to prevent the reinvasion of removed trout species.

There would be an increase in the number of, and habitat for, native cutthroat trout. The construction of fish migration barriers and introduction of native trout would result in establishing and expanding pure-strain native cutthroat trout in approximately 81 miles of project waters. By expanding the range and number of native trout, the risk of the subspecies being lost as the result of a catastrophic event, hybridization, or displacement by other species would be reduced. This would help maintain or increase the genetic diversity in native trout populations. The potential to establish metapopulations of native trout would be increased as well as overall biological diversity.

4.5 WILDLIFE

4.5.1 No Action - Direct and Indirect Effects

There would be no direct or indirect impacts to wildlife under the No Action Alternative. Wildlife populations would continue to function as they currently do.

4.5.2 Proposed Action - Direct and Indirect Effects

There will be no direct or indirect effects to terrestrial Management Indicator Species (MIS). Neither rotenone, nor the treatment activities nor barrier construction would adversely affect mule deer, rocky mountain elk, or wild turkey. Most wildlife species, including birds, mammals, reptiles, adult amphibians, and some invertebrates are not susceptible to rotenone at the concentrations that would be used in the treatments (Appendix A).

Impacts to wildlife associated with the Proposed Action would primarily be limited to aquatic invertebrates (mainly insects in the project areas). Aquatic invertebrates vary in their sensitivity to rotenone, but many species would be reduced or temporarily eliminated within parts of the project areas during the treatment period. Refugia in the project areas would facilitate a relatively rapid recovery of invertebrates. These refugia would include stream sections upstream from the target areas and ponds, seep areas, and springs outside the immediate target areas but within the same drainages. Following the treatments, some species of aquatic insects such as those more tolerant to rotenone or quick dispersers from upstream or nearby refugia would rebound to high population levels in only a few months. The initial reduction in overall numbers may allow formerly obscure taxa to become more prevalent for a short period of time with a series of taxa temporarily becoming dominant. The majority of the aquatic insects in target streams would recover within a year and as taxa numbers increase, the overall community structure will stabilize. There may be some shifts in aquatic invertebrate community dominance from the lack of fish predators following treatment until they are reintroduced. A few stream invertebrates with longer life cycles may need a longer time period to recover to pre-treatment levels but by several years after treatment the aquatic invertebrate community would have equivalent numbers of taxa, community richness, and biotic and diversity indices. Also see Section 4.2.2.

Larval amphibians that might be present in the target area could be killed by the rotenone (Fontenot et al. 1994). However, seeps, boggy areas, and untreated waters in the same drainages as target areas would provide refugia and sources for recolonization. This would insure that amphibian populations would not suffer any long-term impacts due to the proposed action. In addition to the precaution of leaving suitable refugia for larval amphibians, treatments would be timed to avoid the most critical period of vulnerability. Unless surveys conducted prior to the treatments indicated that amphibians were not present in the target areas, treatments would be conducted in the fall when most young-of-the-year amphibians would have developed to more terrestrial stages and are less vulnerable to rotenone.

Indirect impacts to wildlife may include temporary displacement of some birds feeding on fish and/or aquatic invertebrates. It is also possible that the treatment may decrease the forage base for bats utilizing adult aquatic insects as a portion of their diet. These effects would be short term and are considered minor due to the abundance of terrestrial insects and other alternate prey, the timing of the projects, the mobility of birds and bats, and the proximity of similar aquatic habitats and prey sources to

the target waters. The impact of the Proposed Action on the aquatic ecosystem would probably be limited to the aquatic macroinvertebrates and would be similar to that of a flood in the streams within the project area. The overall effect of the proposed treatment on the wildlife depending on fish or aquatic invertebrates for food, and indirectly, on the processes important to the functioning of the ecosystem, may be best evaluated by looking at the results of past fish eradication projects. Many waters have been treated with rotenone in the state as well as other parts of the U. S. since the 1950's. These systems have all recovered quickly with no apparent long-term impacts on associated ecosystems. In many instances, trout, whose diet consists primarily of aquatic invertebrates have been successfully stocked in a water within a month or two following treatment.

4.6 THREATENED, ENDANGERED SPECIES

4.6.1 No Action - Direct and Indirect Effects

There would be no direct or indirect effects on threatened, endangered, or candidate species listed in Section 3.6 under the No Action Alternative.

4.6.2 Proposed Action - Direct and Indirect Effects

The bald eagle is federally listed as a threatened species. It occurs in portions of the project area as a winter migrant. Since the individual projects would be completed in a period of one or two days, there would not be any appreciable disturbance of eagle roosting sites. Although bald eagles feed on fish in some situations, wintering eagles in the project area also feed on carrion and rabbits. During past rotenone treatment projects at Otter Creek Reservoir, bald eagles were observed feeding on fish killed during the fall treatment until ice formed on the reservoir with no ill effects. These fish probably represented a supplement to the eagles' normal food sources during that period.

The western yellow-billed cuckoo has been proposed for listing as threatened or endangered. The project area is within the cuckoo's historic range. Yellow-billed cuckoos have not been found during surveys of potential habitat on the Fishlake N.F. from 2002 through 2004, but it would be premature to conclude that they don't occur on the Forest. If yellow-billed cuckoos do exist in the area, the impacts of the Proposed Action would be negligible on them. Rotenone is not toxic to birds at the concentrations that would be used. Any potential indirect effects would also be minimal. The yellow-billed cuckoo is a neotropical migrant and would probably be in the area between mid-May and mid-August. The timing of the projects, the temporary nature of any impacts on aquatic insects, and availability of alternate (terrestrial) prey items would minimize the potential indirect impacts on any insectivorous birds in the area.

Rotenone will not effect vegetation, so any plants listed in Section 3.6 would not be directly affected by the chemical treatment. Those areas disturbed outside of the floodplain of streams would rapidly return to predisturbance conditions.

Arizona willow is the most likely sensitive plant to be located within the riparian areas that might be disturbed during construction of migration barriers. It is a high elevation willow and would possibly occur only at the Tasha Creek site. Barrier construction there would be located to avoid or minimize impacts to Arizona willow.

The Utah Ecological Services Office of the USFWS reviewed the listed species and their critical habitat within the action area and issued a Section 7 concurrence (March 23, 2007) for a determination of no effect/no adverse modification for all species except bald eagle. Concurrence was also given for the determination of may effect, not likely to adversely affect species/adversely modify critical habitat for bald eagle (Appendix F)

4.7 SENSITIVE SPECIES

4.7.1 No Action - Direct and Indirect Effects

The No Action Alternative would not affect any of the birds, mammals, or amphibians listed in Appendix A. Populations of Bonneville cutthroat trout and Colorado River cutthroat trout would not be established at the locations listed. The range and population size of this subspecies would not be increased as under the Proposed Action.

4.7.2 Proposed Action - Direct and Indirect Effects

The Proposed Action would not have any direct impacts on any of the birds, mammals, or adult stages of the amphibians listed in Appendix A. These species/stages are not susceptible to rotenone at the concentrations that would be used in the proposed treatment.

Larval amphibians are vulnerable to rotenone. Boreal toads have not been documented in any of the project area drainages. Treatment dates in general are after boreal toad (and other amphibians) metamorphosis to more terrestrial juvenile stages when they would be less susceptible to rotenone. Boreal toads observed in the East Fork Sevier River drainage reach terrestrial stages by Mid-August (Rick Fridell UDWR, pers. comm., 1994). If present, larval boreal toads would also be found in nearby refugia outside the target areas and would provide a source for rapid recolonization. Most successful amphibian breeding actually occurs in off-channel habitat away from fish. Larval amphibians could be moved to off channel waters to avoid impacts if they were found during treatments. This was done during the rotenone treatments of the Manning Creek drainage. The relocation actions and numerous off-channel refugia thus limited impacts from the Manning Creek drainage and the area remains one of the best population centers for boreal toads in southern Utah ten years following the treatments. There should thus be no impact to only minimal impact to larval amphibians of any kind, and no impact to boreal toads.

Possible indirect effects to some of the insectivorous species listed in Appendix A (some birds, bats) include the temporary loss of a portion of their available forage base of adult flying insects. This impact would be short-term and would be minimized by the presence of alternate prey species and timing of the project.

Habitat suitable for re-establishing pure strain populations of Bonneville cutthroat trout and Colorado River cutthroat trout would be created by the Proposed Action. Once populations are established, they would represent an increase in the number of viable populations within the historic ranges of these subspecies of cutthroat trout, as well as an expansion of the current range of the subspecies. These actions would reduce the risk that the subspecies will be extirpated as the result of a catastrophic event or other cause.

4.8 GRAZING

4.8.1 No Action - Direct and Indirect Effects

Under the No Action Alternative, there would be no direct or indirect effects on livestock or grazing.

4.8.2 Proposed Action - Direct and Indirect Effects

There would no direct or indirect effects to livestock or grazing under the Proposed Action. Rotenone is not toxic to livestock and the EPA has stated that there is no need to restrict livestock consumption of treated waters. Rotenone has been used in the past as an insecticide on plants and to control grubs on cattle. The UDWR has not asked for any changes in land management practices in project areas with respect to the proposed action. When the current allotment management plans are revised for the Project Area, grazing practices will be reviewed to determine if they are meeting Management Area goals.

Those effects are beyond the scope of this analysis for the Proposed Action.

The implementation of some of the proposed work is contingent upon the status of the Bonneville cutthroat trout and Colorado River cutthroat trout with respect to federal listing. Any change from the two subspecies' current unlisted status to threatened or endangered will require additional review regarding the use of these fish for fishery enhancement projects.

4.9 CULTURAL RESOURCES

4.9.1 No Action - Direct and Indirect Effects

There are no direct or indirect effects to public health and safety under the No Action Alternative.

Proposed Action - Direct and Indirect Effects

Chemical treatment of the waters in the project area would not have an impact to any historical or cultural resources occurring in the area. Surface disturbance associated with construction of fish migration barriers would be limited to a narrow zone within a given stream's floodplain where it is unlikely that any historical or cultural resources would be located. Sites where barriers will be constructed will be evaluated for historical or cultural resources prior to construction in accordance with Utah Code 9-8-404. Final locations for barriers will be chosen so no historical properties will be affected. Appendix E contains a letter of concurrence from the UDWR Archaeologist for the evaluation process outlined in this section.

4.10 PUBLIC HEALTH AND SAFETY

4.10.1 No Action - Direct and Indirect Effects

There are no direct or indirect effects to public health and safety under the No Action Alternative.

4.10.2 Proposed Action - Direct and Indirect Effects

Rotenone has a very low toxicity to humans (Appendix C). It can be irritating to eyes, nose, mouth, and throat if exposure occurs. UDWR and USFS personnel are licensed by the State Department of Agriculture to apply aquatic pesticides. Rotenone would be applied according to label specifications and appropriate safety gear and procedures would be used.

In recent years there has been concern for human safety expressed following a study linking exposure to rotenone to Parkinson's-disease-like symptoms (Betarbet et al. 2000). Unfortunately, fear for human safety was generated by incomplete or inaccurate reporting of the Emory University study. In the study, rats were continuously and intravenously exposed to rotenone by injecting rotenone dissolved with a carrier chemical into their jugular vein. The method of exposure and degree of exposure was in no way comparable to the normal exposure in humans or other mammals through inhalation, ingestion or through the skin (AFS Fish Management Chemical Subcommittee 2001). The authors of the study concluded their study did not show that exposure to rotenone caused Parkinson's disease and stated that "rotenone seems to have little toxicity when administered orally". The intent and value of their study was in developing a model of Parkinson's disease to facilitate further research into the pathology of the disease. After extensive exposure studies and over 50 years of use as a piscicide there is no evidence of harm to humans or mammals at the concentrations to be used in the Proposed Action.

4.11 CUMULATIVE EFFECTS

4.11.1 No Action - Cumulative Effects

Under the No Action Alternative there would be no cumulative effects to any of the resources addressed

except recreation and the fishery. If the proposed projects are not implemented and enhancement and protection of native trout populations are not demonstrated, federal listing of the two native subspecies of trout is more likely. Actions mandated under federal listing could include changes in nonnative trout stocking programs and fishing regulations.

4.11.2 Proposed Action - Cumulative Effects

Cumulative effects of the proposed action could include maintaining fishing opportunities for nonnative trout and maintaining a consistent sport fishing management program at other waters in the state. Implementing the proposed projects and meeting the goals of establishing native trout would help to insure that species of native trout would not be federally listed. If, on the other hand, the proposed projects are not implemented and enhancement and protection of native trout populations are not demonstrated, federal listing of the two native subspecies of trout is more likely. Actions mandated under federal listing could include changes in nonnative trout stocking programs and fishing regulations. Such actions would alter sport fish management and fishing recreation. There would be no impacts to species listed in Section 3.6 in the cumulative effects analysis area. While effects from past, present, and foreseeable future action to these species are unknown, the proposed action would not create any additional effects.

There are no cumulative effects to public health and safety under the Proposed Action. Most of the chemical would be flushed from streams in the project area within 12 hours following the project. None of the other actions listed in Appendix D have had an effect on public health and this alternative would not contribute any lasting effects.

4.12 COMPLIANCE WITH OTHER LAWS

4.12.1 Compliance with the National Forest Management Act

The discussion below follows the Code of Federal Regulation designation of management requirements that must be met.

4.12.1.1 Resource Protection, 36 CFR 219.27 (a)(5): "Provide for and maintain diversity of plant and animal communities to meet overall multiple-use objectives..."

The treatments and introductions planned in the Proposed Action would enhance, protect and extend the range of native species. This would tend to maintain diversity and meet multiple-use objectives which include providing recreation.

4.12.1.2 Resource Protection, 36 CFR 219.27 (a)(6): "Provide for adequate habitat to maintain viable populations of existing native vertebrate species consistent with multiple-use objectives established in the plan.

The waters listed in the project area currently contain suitable physical habitat for subspecies of native trout. By removing nonnative trout that compete with, prey on, or hybridize with native trout, the Proposed Action would provide suitable biological habitat as well as physical habitat.

4.12.2 Clean Water Act

The Clean Water Act (CWA) requires each state to implement its own water quality standards. The State of Utah's Water Quality Antidegradation Policy requires maintenance of water quality to protect existing instream Beneficial Uses on streams designated as Category 1 High Quality Waters. All surface waters geographically located within the outer boundaries of the National Forest, whether on private or public lands are designated as High Quality Waters (Category 1). This means they will be maintained at existing high quality. New point sources will not be allowed and non-point sources will be controlled to

the extent feasible through implementation of Best Management Practices (BMPs) or regulatory programs (Utah Division of Water Quality 1994). The State of Utah and the Forest Service have agreed through a 1993 Memorandum of Understanding to use Forest Plan Standards & Guidelines and the Forest Service Handbook (FSH) 2509.22 Soil and Water Conservation Practices (SWCPs) as the BMPs. The use of SWCPs as the BMPs meet the water quality protection elements of the Utah Nonpoint Source Management Plan.

The Beneficial Uses and High Quality of water in the streams draining the Project Area would be maintained during and following project implementation through the proper implementation of BMPs (SWCPs) as described in Chapter Two.

4.12.3 Executive Order 11990 Of May, 1997

This order requires Federal agencies to take action to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In compliance with this order, Federal agency direction requires that an analysis be completed to determine whether adverse impacts would result.

The locations of wetlands in the Project Area were identified in the delineation and inventory of critical watershed areas. No ground disturbing activities will occur within 50 ft of any wetland, seep, or spring. With a 50 ft buffer area around any wetlands, seeps, or springs and implementation of SWCPs and BMPs, any of the alternatives would be in compliance with Executive Order 11990.

4.12.4 Executive Order 11988 Of May, 1977

This order requires Federal agencies to provide leadership and to take action to (1) minimize adverse impacts associated with occupancy and modifications of floodplains and reduce risks of flood loss, (2) minimize impacts of floods on human safety, health, and welfare, and (3) restore and preserve the natural and beneficial values served by floodplains. In compliance with this order, the Federal agency requires an analysis be completed to determine the significance of Proposed Actions in terms of impacts to flood plains.

Ground disturbing activities will be limited to a small zone at barrier sites. Barriers will be constructed of large native rock and will mimic natural boulder plunge-pool habitats. Barriers will be keyed into adjacent banks to prevent erosion and promote development of a new floodplain above the structure. Disturbed areas will be revegetated. No new roads will be established. Therefore any of the proposed alternatives will be in compliance with Executive Order 11988.

4.12.5 Endangered Species Act Of 1973, As Amended

The USFWS has determined that there would be no adverse effects to populations of threatened, endangered, or proposed wildlife or plant species relative to the Proposed Action or any alternative (Appendix F).

4.12.6 American Antiquities Act Of 1906 And Historic Preservation Act Of 1966

Based on the discussions in Chapters Three and Four concerning Heritage Resources, and the process for evaluating and protecting cultural resources in Appendix E, it has been determined that there will be no measurable effects to any Historic Properties relative to any of the alternatives.

4.12.7 Clean Air Act, As Amended In 1977

Based on discussions in Chapter Three and Four concerning Air Quality, it has been determined that there would be no measurable effects to air quality in class I or II airsheds relative to any of the alternatives.

4.12.8 Executive Order 13186 of January 2001

This order clarifies requires Federal Agencies to evaluate environmental actions and projects for their effects on migratory birds. There will be no direct impact on migratory species as a result of treatment activities. Indirect effects include the temporary displacement of piscivorous migratory fowl, the reduction of aquatic insects that provide food for some migratory birds, and the temporary invasion of riparian habitats by project workers.

4.13 MONITORING

4.13.1 Monitoring Objective

Implementation and effectiveness monitoring would be conducted to measure the effects of the selected alternative on aquatic resources within the project area. Implementation monitoring assesses whether or not the project was implemented as described in the EA. Effectiveness monitoring determines if the management actions accomplished what was intended, e.g., nonnative species were removed from the treated area, and native cutthroat trout were established.

4.13.2 Monitoring Plan

Waters will be thoroughly examined during and following treatment to ascertain whether a complete removal of target species of fish has occurred, and to determine the extent of fish loss in downstream areas. Visual observations and single pass electrofishing surveys will be used to determine treatment effectiveness in stream sections. Sentinel fish placed in live cages downstream of target waters will be used to determine treatment extent and effectiveness of detoxification at locations where detoxification is necessary. Electrofishing surveys will be used to monitor the development of native trout populations in project areas and the effectiveness of fish-migration barriers constructed at the downstream boundaries of project reaches. Success will be documented in a report from UDWR Aquatics Biologists to be filed in the UDWR regional office.

Aquatic macroinvertebrate samples have already been collected from 6 of the streams proposed for treatments. Two to three of these streams would have post-treatments samples collected from them 1 to 3 years following the treatment. Aquatic macroinvertebrate taxa lists and biological indices would be compared between the pre and post treatment dates to monitor aquatic macroinvertebrate recovery.

SECTION 5: LIST OF PREPARERS

The following individuals assisted in the preparation of this document or provided technical support.

Name	Title	Subject Area
Mike Ottenbacher	UDWR Aquatics Program Manager	Fisheries/IDTL
Jim Whelan	FNF/UDWR Fisheries Biologist	Fisheries/NEPA
Steve Brazier	DNF Fisheries Biologist	Fisheries/NEPA
Dale Hepworth	UDWR Aquatics Prog Mngr (ret)	Aquatics
Chuck Chamberlain	UDWR Aquatics Biologist	Fisheries/NEPA
Keith Day	UDWR Wildlife Biologist	T & E Species
Rick Fridell	UDWR Wildlife Biologist	Native Aquatics
Dianne Freeman	Environmental Coordinator	NEPA
Kevin Sloan	USFWS Fisheries Biologist	Federal Assistance/NEPA

SECTION 6: LIST OF AGENCIES AND PERSONS CONSULTED

California Department of Fish and Game

Cedar City District Bureau of Land Management

Dixie National Forest

Fishlake National Forest

Five County Association of Governments

Richfield District Bureau of Land Management

Six County Commissioners Organization

Utah State Division of Drinking Water

Utah State Resource Development Coordinating Committee

SECTION 7: LITERATURE CITED

- AFS Fish Management Chemicals Subcommittee. 2001. Relationship between rotenone use in fisheries management and Parkinson's disease. American Fisheries Society, Bethesda, Maryland.
- Barry, J. J. 1967. Evaluation of creel census, rotenone embayment, gill net, traps and electrofishing samples, by complete drainage of Lenape and Bischoff Reservoirs. Indiana Department Natural Resources, Division Fish Game, Fishery Research Section. 35 p.
- Betarbet, R., T. Sherer, G. MacKenzie, M. Carcia-Osuna, A. Panov, and J. Greenamyre. 2000. Chronic systemic pesticide exposure reproduces features of Parkinson's disease. *Nature Neuroscience* 3:12 1301-1306.
- Bradbury, Alex. 1986. Rotenone and trout stocking. A literature review with special reference to Washington Department of Game's Lake Rehabilitation Program. Fisheries Management Report 86-2. 181 p.
- California Department of Fish and Game. 1983. An assessment of the use of chemical fish toxicants in California. Inland Fisheries Administrative Report No 83-2. 21 p.
- _____. 1994. Rotenone use for fisheries management. Final programmatic environmental impact report (subsequent). Sacramento, CA. 334 p.
- Engstrom-Heg, R., R. T. Colesante, and E. Silco. 1978. Rotenone Tolerances of Stream-bottom Insects. *New Your Fish and Game Journal* 25(1):31-41.
- Finlayson, B. J., R. A. Schnick, R. L. Cailteaux, L. DeMong, W. D. Horton, W. McClay, C. W. Thompson, and G. J. Tichacek. 2000. Roteone use in fisheries management; administrative and technical quidelines manual.
- Fontenot, L. W., G. P. Noblet and S. G. Platt. 1994. Rotenone hazards to amphibians and reptiles. *Herpetological Review* 25(4):150-156.
- Hoffman, D. A. and R. C. Payette. 1956. "Operation Carp" on a San Diego reservoir. *Water Sewage Works* 103(7):281-287.
- Hynes, H. B. N. 1972. *The Ecology of Running Waters*. University of Toronto Press, Toronto. 555 p.
- Lentsch, L., Y. Converse, and J. Perkins. 1997. Conservation agreement and strategy for Bonneville cutthroat trout (*Oncorhynchus clarki pleuriticus*) in the State of Utah. Publication No. 97-19. Utah Division of Wildlife Resources, Salt Lake City.
- Lentsch, L. and Y. Converse. 1997. Conservation agreement and strategy for Colorado River cutthroat trout (*Oncorhynchus clarki utah*) in the State of Utah. Publication No. 97-20. Utah Division of Wildlife Resources, Salt Lake City.
- National Academy of Science. 1983. Rotenone. Pages 63-70 in *Drinking water and health, Volume 5. Safe Drinking Water Committee, Board on Toxicology and Environmental Health Hazards, Commission on Life Sciences, National Research Council, National Academy Press, Washington, D. C.*
- Rodriguez, R. L. (compiler). 2005. Life History and Analysis of Endangered, Threatened, Candidate, Sensitive, and Management Indicator Species of the Fishlake National Forest, Ver. 4.0. USDA Forest Service, Fishlake National Forest, Richfield, UT. 152pp.

- Rodriguez, R. L. (compiler). 2004. Life History and Analysis of Endangered, Threatened, Candidate, Sensitive, and Management Indicator Species of the Dixie National Forest, Ver. 4.0. USDA Forest Service, Fishlake National Forest, Richfield, UT. 118pp.
- Schmidt, Bruce R., Paul W. Birdsey, Bryce R. Nielson, Leo Lentsch and M. Jane Perkins. 1995. A conceptual management plan for cutthroat trout in Utah. Publication No. 95-7. Utah Division Wildlife Resources, Salt Lake City. 47 p.
- Sousa, Robert J., Fred P. Meyer and Rosalie A. Schnick. 1987. Better fishing through management. U. S. Fish and Wildlife Service, Washington, D. C.
- United States, Department of Agriculture - Forest Service. 1986. Land and resource management plan for the Dixie National Forest. Supervisors Office, Dixie National Forest, Cedar City.
- _____. 1986. Fishlake National Forest land and resource management plan. Supervisors Office, Fishlake National Forest, Richfield.
- Utah Department of Environmental Quality. 1994. Standards of Quality for Waters of the State. R317-2, Utah Administrative Code. Division of Water Quality, Salt Lake City.
- Utah Division of Wildlife Resources. 1992. A strategic plan for the comprehensive management of Utah's wildlife resources. Salt Lake City. 249 p.
- Whelan, J. E. 2002. Aquatic macroinvertebrate monitoring results of the 1995 and 1996 rotenone treatments of Manning Creek, Utah. Publication Number 02-04. Utah Division of Wildlife Resources, Salt Lake City, UT. 34pp.

Appendix A

Threatened, Endangered, and Sensitive Species Lists by Agency

Appendix A. Species federally listed as threatened or endangered, UDWR Sensitive Species, and species listed as sensitive by the Regional Forester which occur or may occur in the project area.

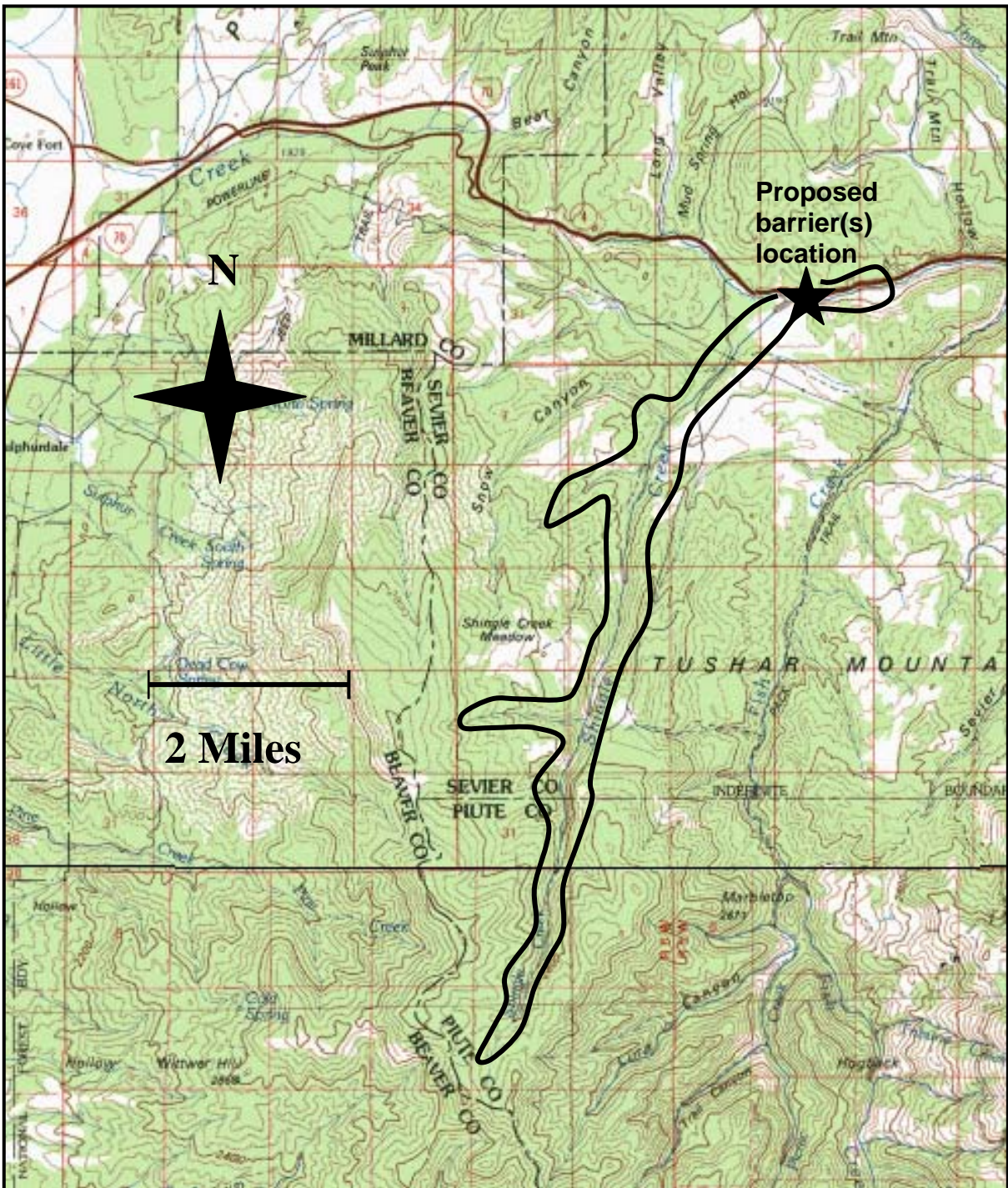
COMMON NAME / SCIENTIFIC NAME	USFWS ¹	USFS ²	UDWR ³
MAMMAL SPECIES			
Allen's big-eared bat <i>Idionycteris phyllotis</i>			SD
Big free-tailed bat <i>Nyctinomops macrotis</i>			SP/SD
Brazilian free-tailed bat <i>Tadarida brasiliensis mexicana</i>			SP/SD
Fringed myotis <i>Myotis thysanodes</i>			SD
Marten <i>Martes americana</i>			SD
Pika <i>Ochotona princeps</i>			SD
Spotted bat <i>Euderma maculatum</i>		S	SP
Townsend's big-eared bat <i>Plecotus townsendii</i>		S	SP/SD
Western red bat <i>Lasiurus blossevillii</i>			SP/SD
Western small-footed myotis <i>Myotis ciliolabrum</i>			SD
BIRD SPECIES			
American white pelican <i>Pelecanus erythrorhynchos</i>			SD
American peregrine falcon <i>Falco peregrinus anatum</i>		S	?
Bald eagle <i>Haliaeetus leucocephalus</i>	T		T
California Condor <i>Gymnogyps californianus</i>	E/NE		SD
Common yellowthroat <i>Geothlypis trichas</i>			SP
Ferruginous hawk <i>Buteo regalis</i>			T
Grasshopper sparrow <i>Ammodramus savannarum</i>			SP/SD
Mexican spotted owl <i>Strix occidentalis lucida</i>	T		T
Northern goshawk <i>Accipiter entiles articapillus</i>		S	SP
Osprey <i>Pandion halietus</i>			SD
Peregrine falcon <i>Falco peregrinus anatum</i>		S	?

Swainson's hawk <i>Buteo swainsoni</i>			SP
Three-toed woodpecker <i>Picoides tridactylus dorsalis</i>		S	SD
Williamson's sapsucker <i>Sphyrapicus thyroideus</i>			SD
FISH SPECIES			
Bonneville cutthroat trout <i>Oncorhynchus clarki utah</i>		S	CS
Colorado River cutthroat trout <i>Oncorhynchus clarki pleuriticus</i>		S	CS
AMPHIBIAN SPECIES			
Boreal toad <i>Bufo boreas</i>			SP

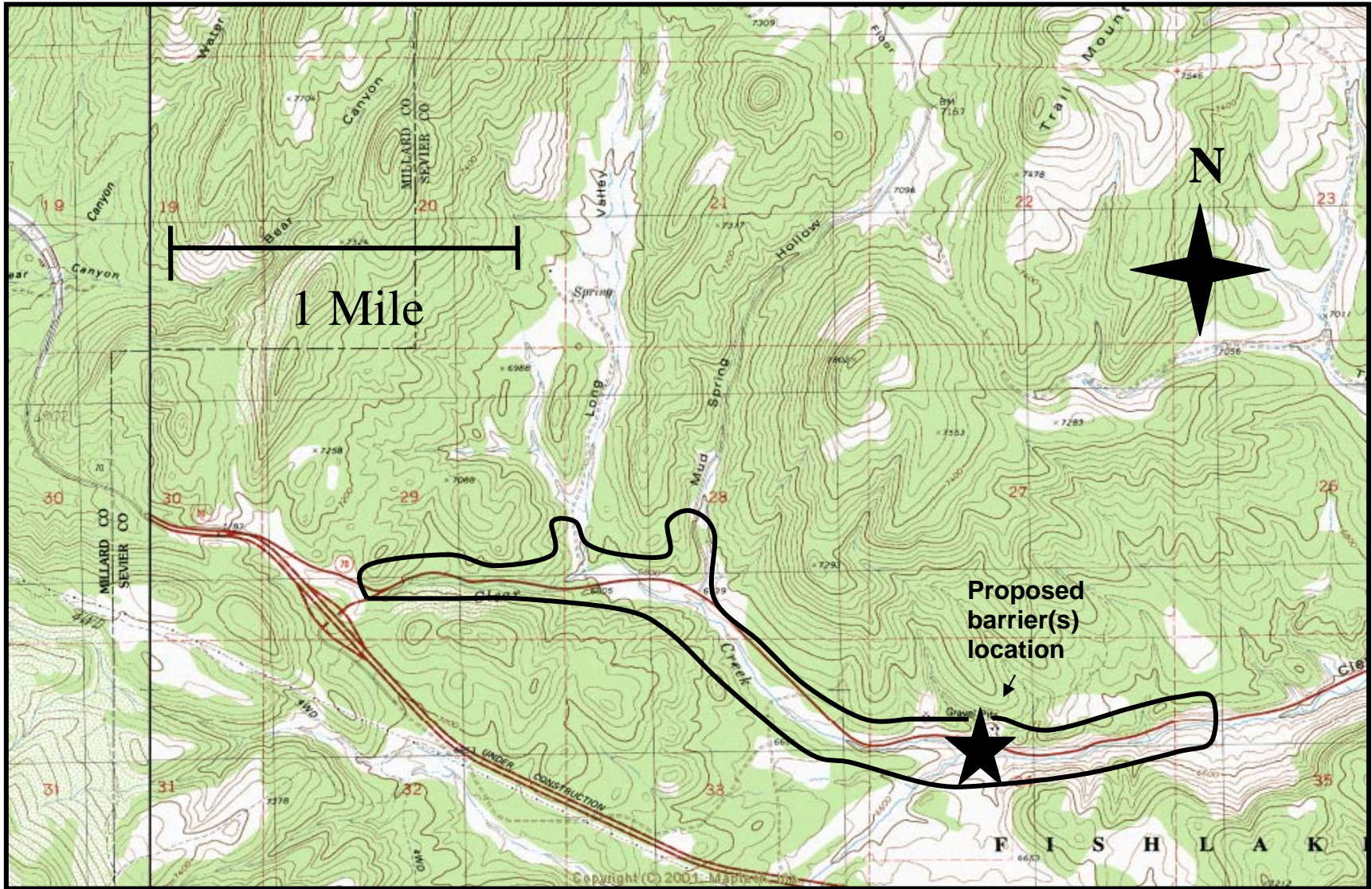
- 1) E = federally listed as endangered; T = federally listed as threatened; NE = federally classified as a nonessential population.
- 2) E = federally listed as endangered; T = federally listed as threatened; S = Sensitive species as classified by the Regional Forester, Region 4.
- 3) E = state listed as endangered; T = state listed as threatened; SP = of special concern due to declining populations; SD = of special concern due to limited distribution; CS = managed under a Conservation Agreement to preclude its listing.

Appendix B

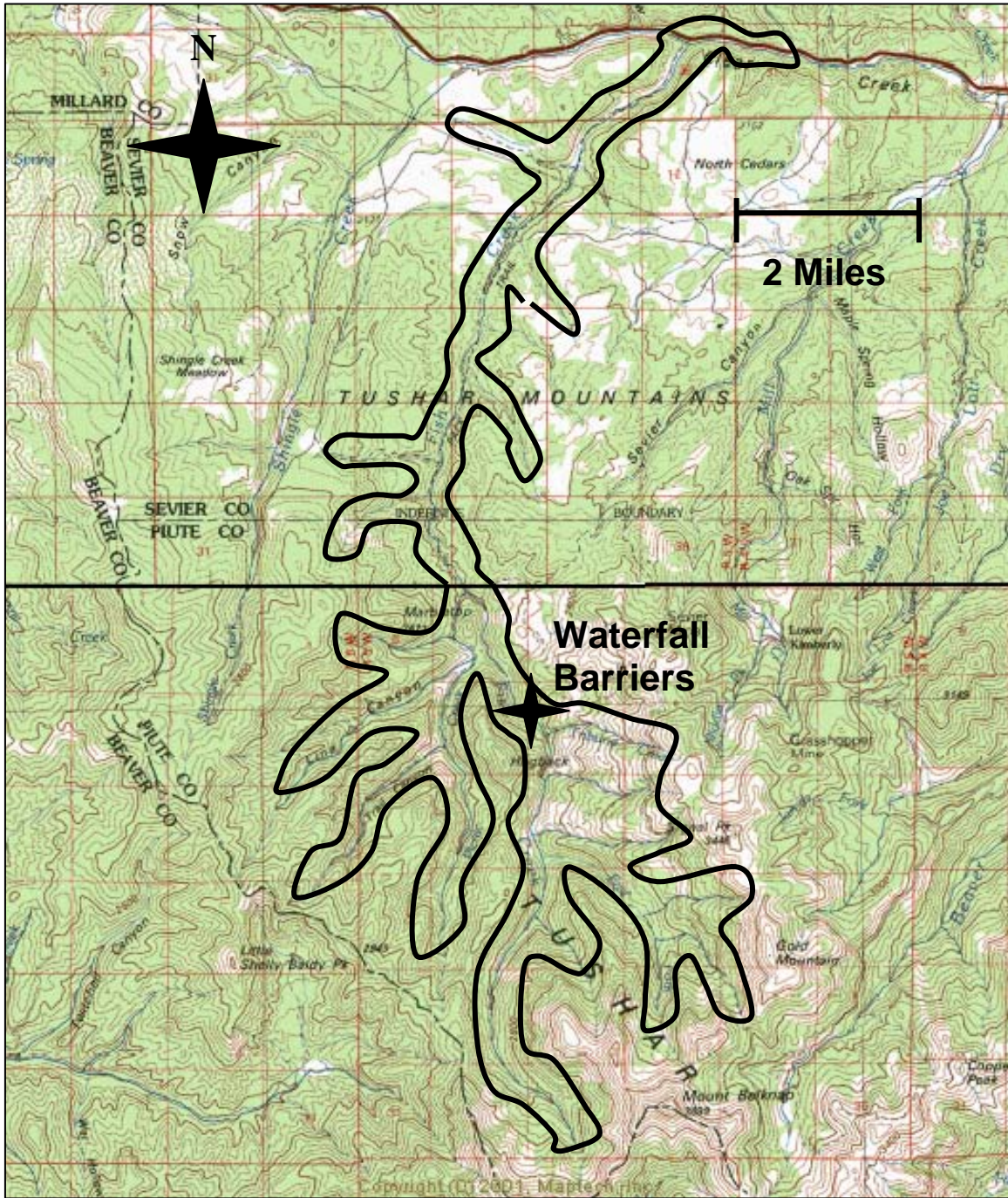
Maps of proposed project sites



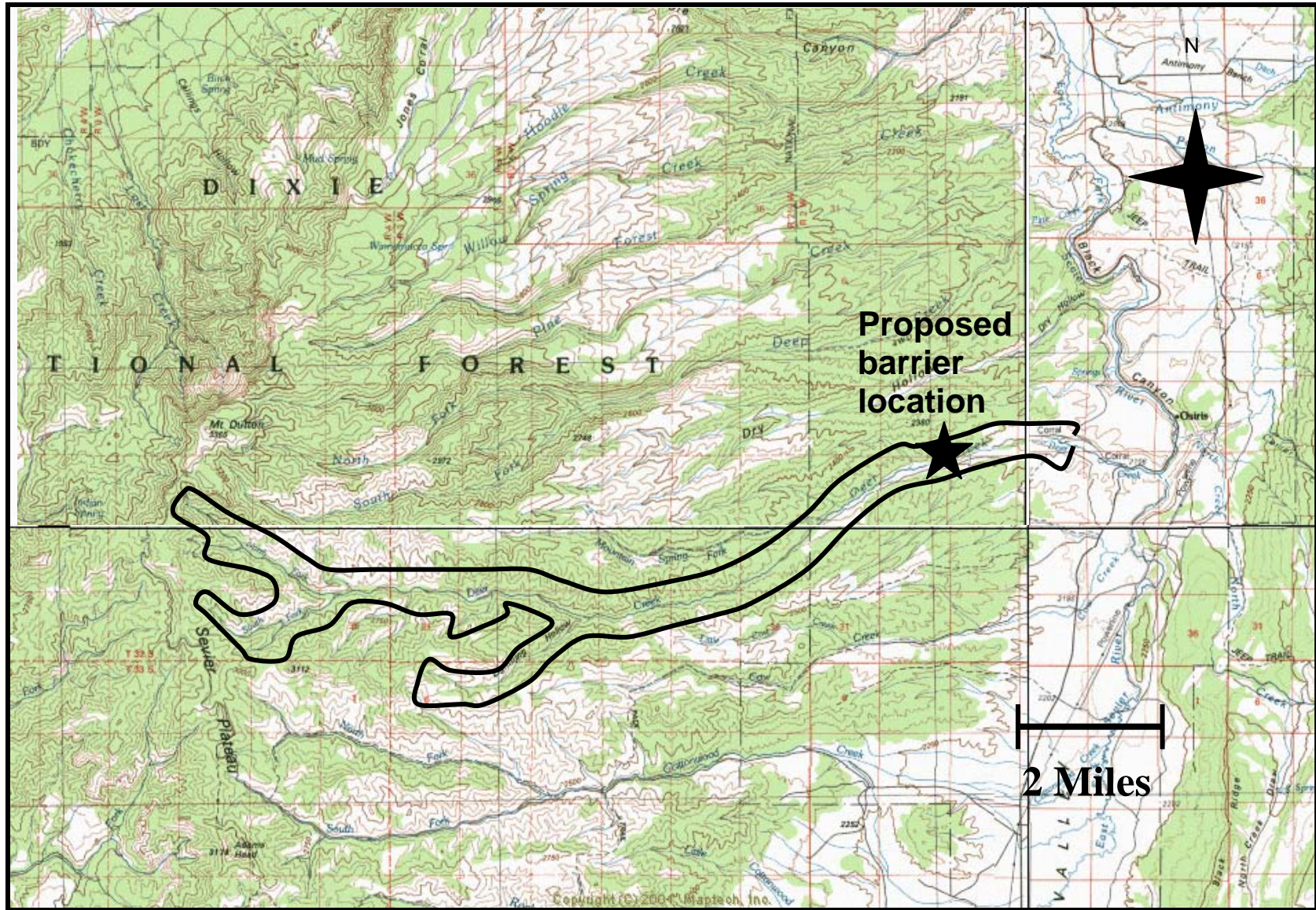
Map of Shingle Creek, Sevier Co., showing location of proposed rotenone treatment project. The location of the proposed fish migration barrier(s) is also given.



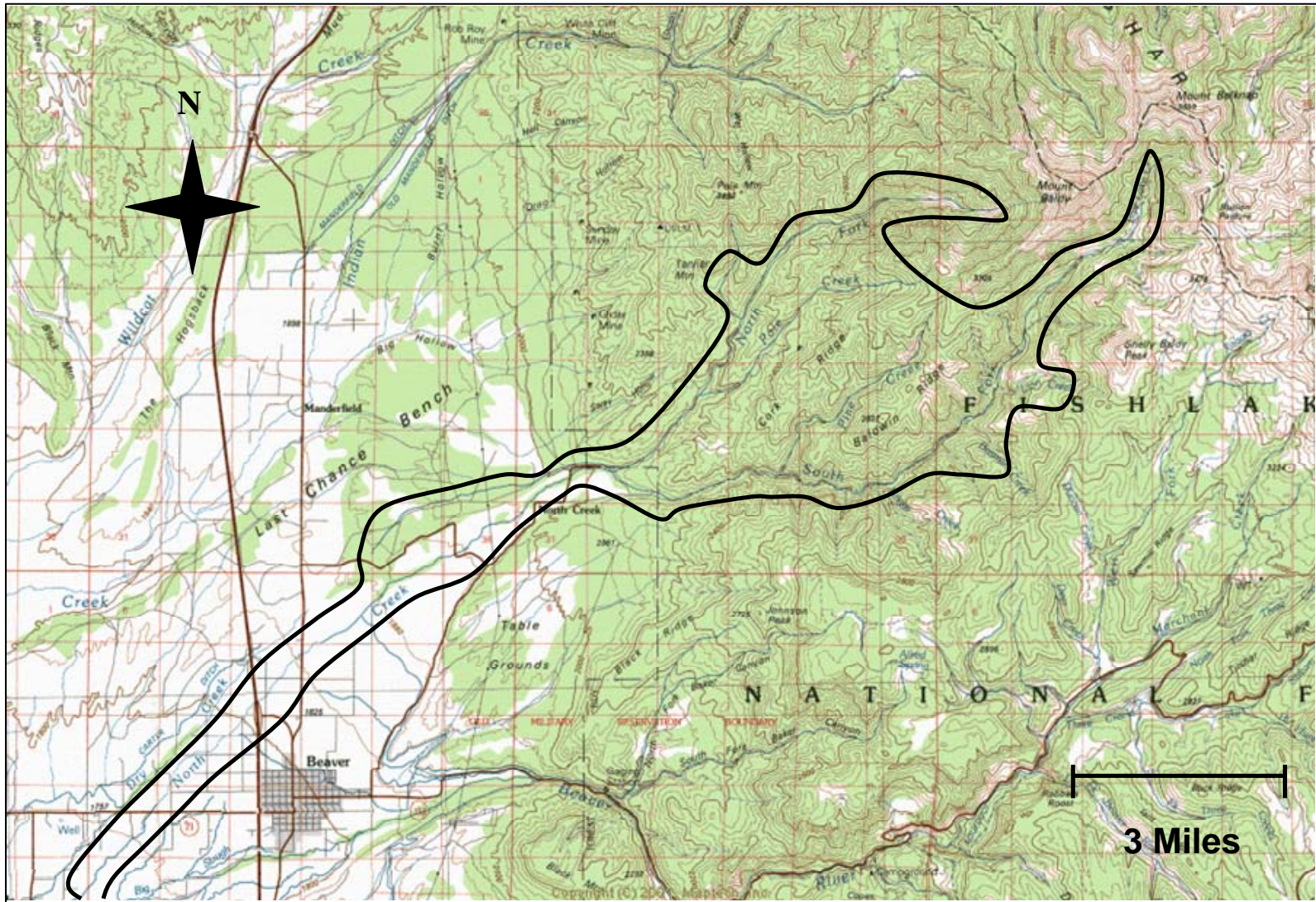
Map of the upper Clear Creek drainage, Sevier Co. showing location of proposed rotenone treatment project. The location of the treatment detoxification site and proposed fish migration barrier(s) are also given.



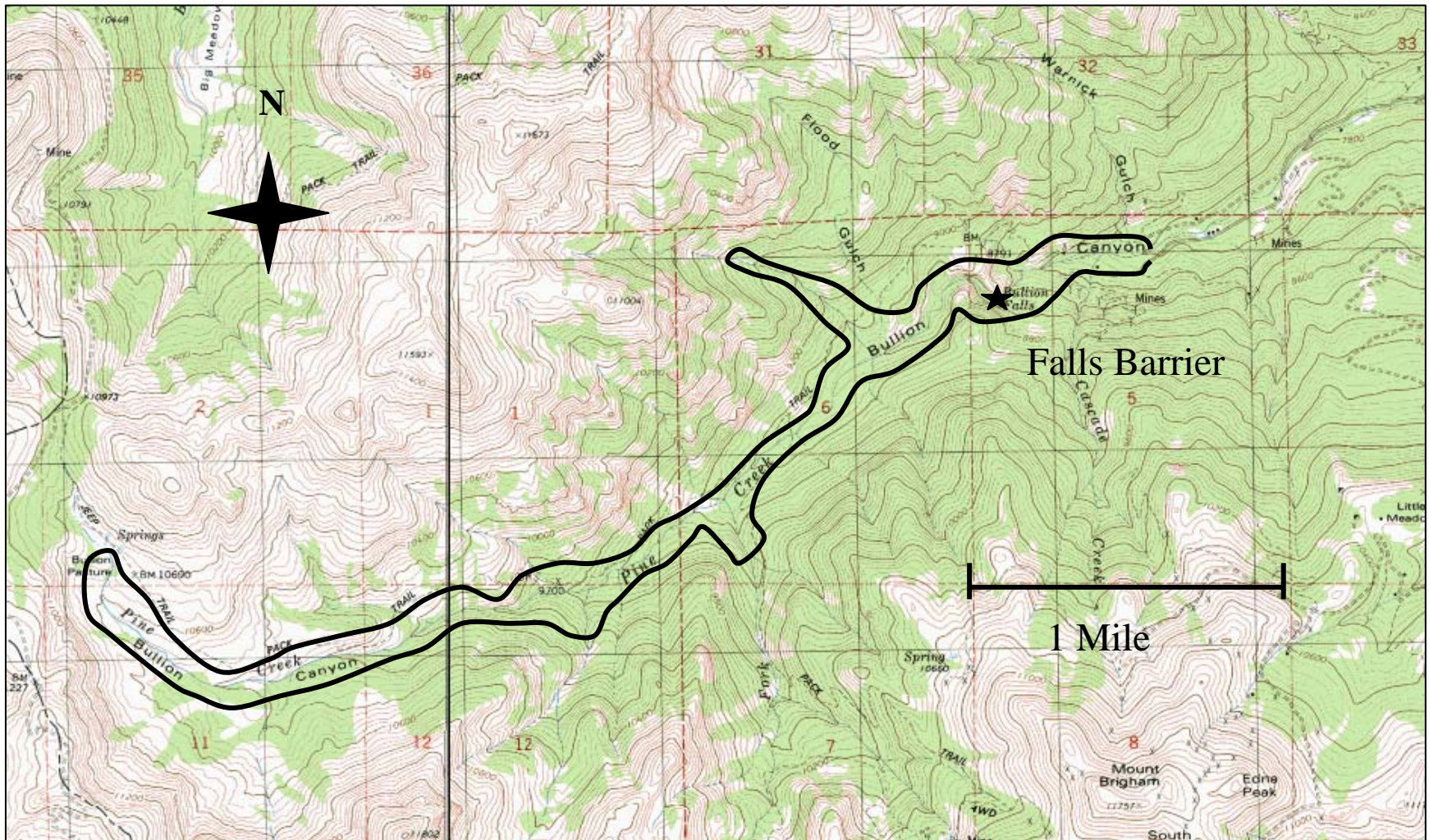
Map of Fish Creek, Sevier Co. and Piute Co., showing location of proposed rotenone treatment project. The location of natural fish migration barriers is also given.



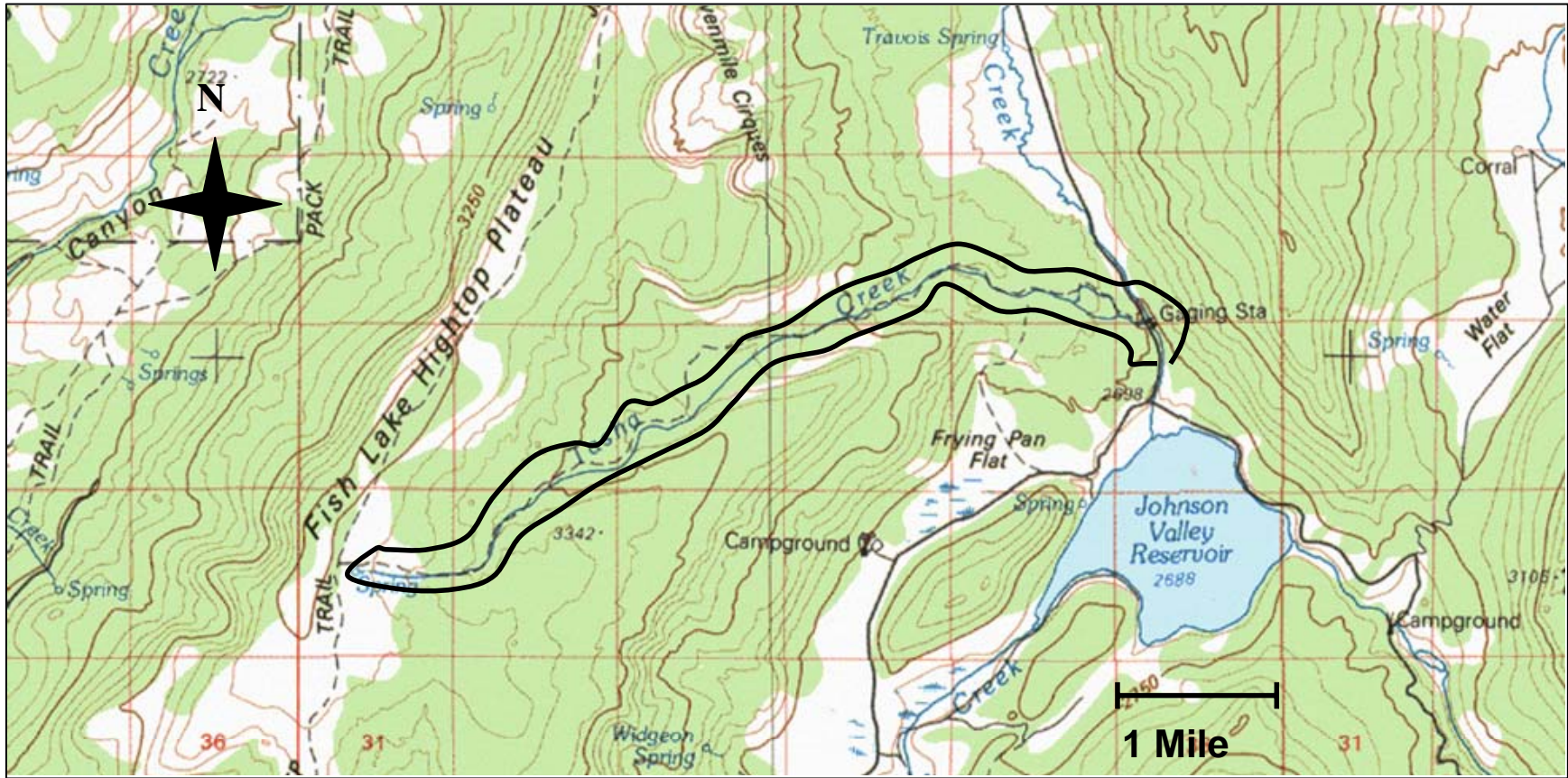
Map of Deer Creek, Garfield Co., showing location of proposed rotenone treatment project. The location of the proposed fish migration barrier(s) is also given.



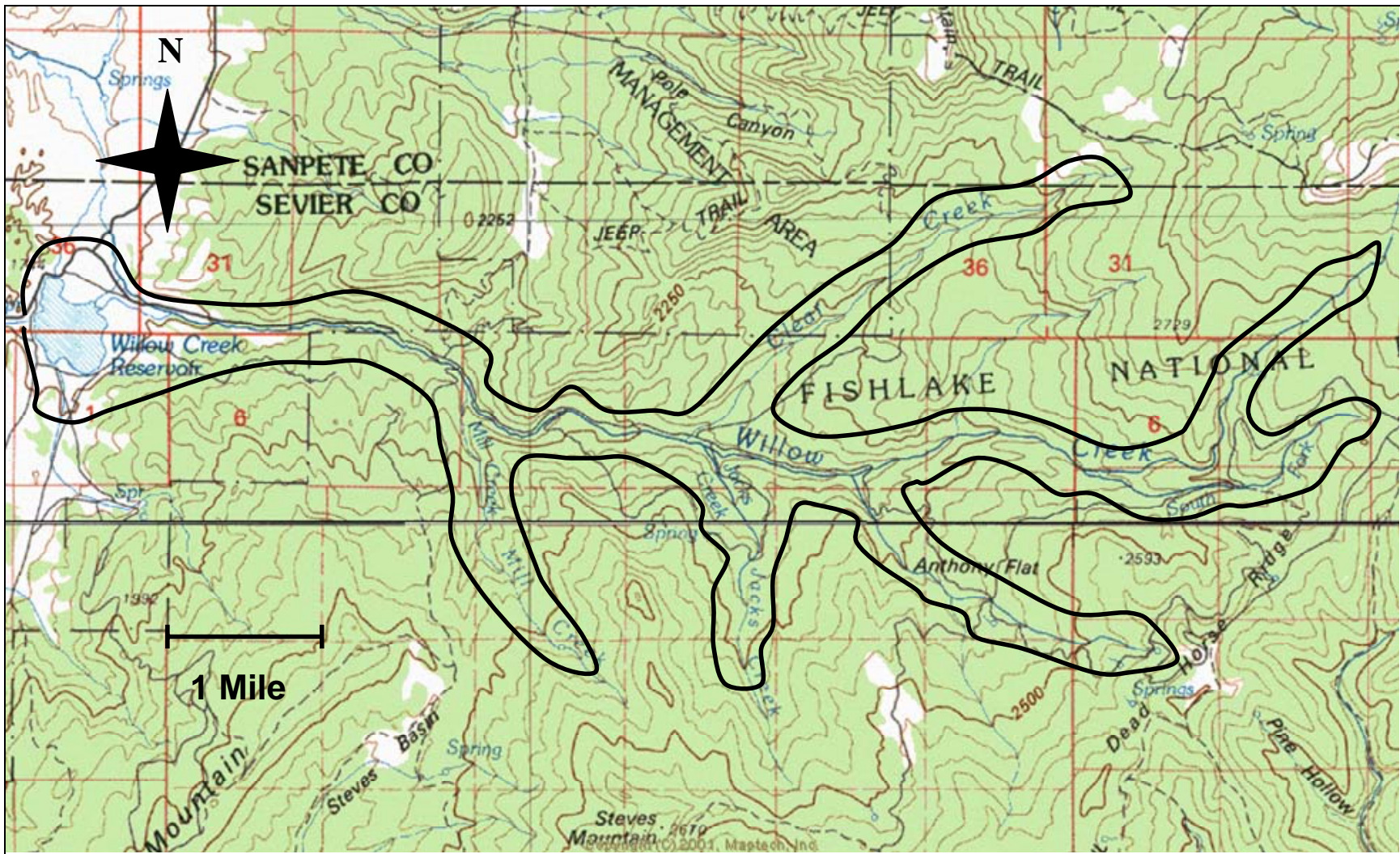
Map of North Creek, Beaver Co., showing location of proposed rotenone treatment project.



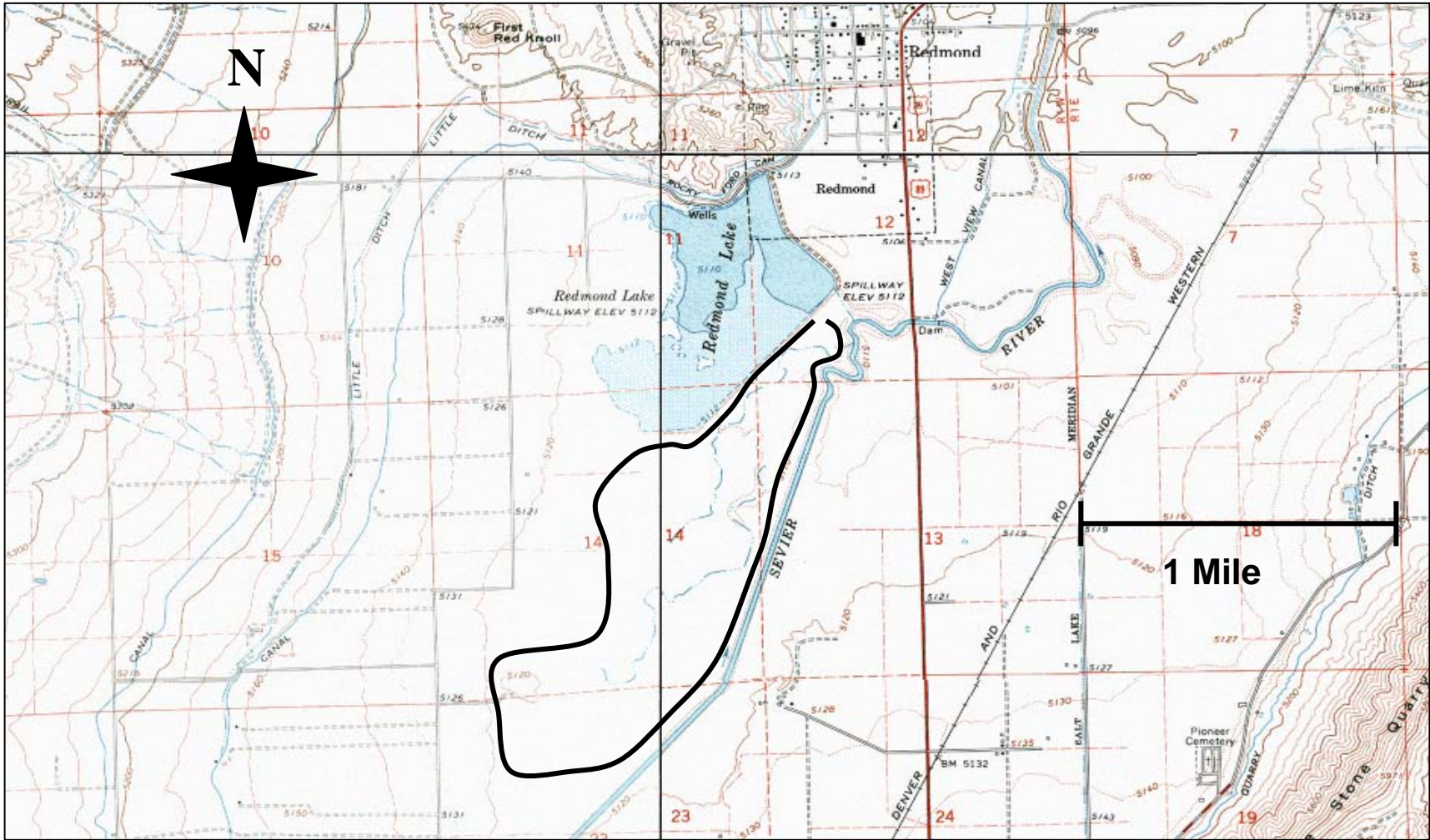
Map of Pine Creek (Bullion Canyon) showing location of proposed rotenone treatment project. The location of a natural fish migration barrier (Bullion Falls) is also given.



Map of Tasha Creek, Sevier Co., showing location of proposed rotenone treatment project.



Map of Willow Creek, Sevier Co., showing location of proposed rotenone treatment project.



Map of Redmond Marsh , Sevier Co., showing location of proposed rotenone treatment project.

Appendix C

Better Fishing Through Management – How Rotenone is Used To Help Manage Our Fishery Resources More Effectively

Appendix D

Cumulative Effects Project List

Cumulative Effects Project List

Past and Current Activities:

Livestock Grazing

Livestock grazing has occurred for over 100 years within the project area. Standards and guidelines for livestock grazing have been established in specific plans and are administered by rangeland specialists. Generally these plans permit moderate grazing utilization levels and incorporate a deferred or rest rotation system to allow for improved plant vigor and residual biomass on part of the allotment each year. Historic grazing typically removed more vegetation and was permitted for longer grazing seasons, this reduced vegetation that provided forage for some species, and nesting habitat with cover for other wildlife species. Currently through proper rangeland management, these effects are being reduced and improvement is occurring range wide as amount of vegetation and grazing seasons are closer monitored and enforced. NEPA decisions such as the Forest Utilization Standards provide direction for the management of livestock on National Forest System lands within the project area.

Vegetation Treatment Projects

Timber sales

Timber thinnings

These watersheds have had historic harvest in settlement times. In recent times only North Creek has had timber management activities. In terms of aquatics, the effects of timber management projects are generally primarily the increase in road networks and associated hydrologic changes.

Chaining Maintenance

Removal of invading junipers in old chainings at the base of Shingle and Fish Creek. No effects with aquatics.

Noxious Weed Spraying

Noxious weed control is an important management tool to prevent the spread and establishment these ecological pests. Spraying is done in accordance with an EA prepared for the Fishlake and Dixie National Forests and has little cumulative effect to aquatic resources. Preventing the further spread of noxious weeds is a beneficial action.

Recreational Activities

Camping - dispersed

Hunting

Fishing

Misc. day use activities

These activities are short duration by definition. Dispersed camping has resulted in small disturbances, some of which input localized sediment into streams. Overall in these watersheds the impacts of such activities to aquatic biota are minimal and are primarily associated with motorized access.

ATV/OHV riding

ATV (All-terrain Vehicles) riding is a popular activity by many local residents and others that come from all over the United States to experience trails open to ATV's. There are various ATV trails and non-motorized trails within the project area. Use statistics show that the amount of ATV use has been increasing by 10% annually over the last few years. The impacts to aquatics are usually minimal unless trails are located in riparian areas, near streams or lakes, or actually ford streams. Several of the drainages have no authorized motorized access, however.

Wildfires

There have been a few fires in and around/near the project area and CEA. The largest one was the Sanford Fire, which burned in 2002. The fire burned approximately 70,000 acres on the Sevier Plateau (Powell R.D., Dixie N.F.). Upland and riparian vegetation has reestablished and is recovering. The Sanford Fire extirpated several trout populations, however.

Fire suppression, especially when coupled with changes in land use such as grazing, has affected fire ecology in some portions of the CEA. In general, low intensity ground fires have become less common in some fuel/vegetation types since European settlement.

Fire suppression activities, such as drafting water from streams or lakes, has the potential to spread aquatic nuisance species (ANS).

Fuels Reduction Projects

Prescribed Fire

Upper Clear Creek and lower Shingle Creek have been prescribed burned to reduce woody fuel types. Effects to fisheries have been relatively short-term and localized.

Mechanical Projects

Thinning of woody fuels by mechanical means. Impacts to vegetation and ground surface and hence aquatic biota are minimal from this program.

Special Uses

Special uses occur throughout the CEA area such as: firewood and post cutting, outfitter and guide operations, municipal water developments, small mining claims, irrigation diversions, roads, water lines, etc. Special uses such as these are authorized by Special Use Permits; usually these permits require a separate environmental assessment, which discloses the impacts from these activities.

Water Management

Water management structures, canals, and other improvements are permitted as Special Uses and mentioned above. Their effects of irrigation diversion have generally disconnected streams from lower had major effects across the Beaver River watershed, including the South Fork Vegetation Management project CEA. The primary effect has been to alter the amount and timing of water flows in natural channels.

Reasonably Foreseeable Activities:

Fishlake National Forest

Tusher Grazing EIS

The Tusher Grazing EIS is evaluating the environmental effects of reissuing grazing permits on the Beaver R.D. The proposed action would likely have similar standards as currently applied, but may result in improved management and less negative impacts to aquatic resources due to monitoring and adaptive management.

Travel Plan

OHV travel management planning is being undertaken on the Forest. The proposed action would close the project area to cross-country travel off of designated routes, and thus would reduce the potential for future degradation from ATVs.

Oil and Gas Leasing EIS

Oil and Gas leasing EIS will determine which lands on the Fishlake N.F. are suitable for opening for oil and gas leasing.

Gooseberry – Seven Mile Road Paving

The gravel road from I-70 to Fish Lake up Gooseberry drainage and down Seven Mile is planned for paving. Work has begun on the Gooseberry side. This will eventually increase the number of Forest visitors near Tasha Creek.

Dixie National Forest

Travel Plan

OHV travel management planning is being undertaken on the Forest. The proposed action would close the project area to cross-country travel off of designated routes, and thus would reduce the potential for future degradation from ATVs.

Oil and Gas Leasing EIS

Oil and Gas leasing EIS will determine which lands on the Dixie N.F. are suitable for opening for oil and gas leasing. _____

Summary of Cumulative Effects:

In terms of fisheries, the project area watersheds have been changed from pre-settlement conditions. The introduction of non-native fish, stocking of hatchery fish, grazing, fires, fire management activities, timber/thinning operations, irrigation diversion, and water manipulation has altered riparian and upland vegetation composition and densities and riparian environments, which has reduced habitat for resident trout species and aquatic macroinvertebrates in some cases and created habitat in others. In general, stream habitats have generally been reduced in quantity and quality. The native cutthroat trout have been extirpated and native non-game fish reduced in numbers and displaced by numerous introductions of non-native fish since the pioneer settlement. Despite these cumulative effects and concerns, the project areas still remain important fisheries resource in the state of Utah.

As described above, the direct and indirect effects from the Proposed Alternative are expected to be minimal and of a short-term duration provided that the required design criteria are properly implemented and the project properly administered. Thus the effects of the activities listed above in the cumulative effects section, in combination with either the No Action alternative or the Proposed Action are not expected to cause long-term measurable changes (beneficial or adverse) to the resources discussed in this assessment. None of the alternatives would add cumulative effects that would adversely affect other resources in the long term (>10 years). The activities listed above in the cumulative effects section are not expected to increase as a result of implementation of the action alternative.

Appendix E

Letter of Concurrence for Cultural Resources Evaluation Process

April 6, 2007

Mike Ottenbacher
Regional Aquatics Manager
Utah Division of Wildlife Resources
P.O. Box 606
Cedar City, UT 84721

RE: EA for Native Trout Restoration and Enhancement Projects in SW Utah

Dear Mike,

I have read your proposal for cultural resource assessment for the EA for Native Trout Restoration and Enhancement Projects in SW Utah, and I concur with your proposed treatment plan. As the time nears for each individual barrier to be constructed please notify me and I will assess each barrier location and conduct whatever level of research and survey that is appropriate for the location.

Sincerely,

A handwritten signature in cursive script that reads "Kathie A. Davies".

Kathie A. Davies
Archaeologist

Appendix F

Intra-Service Section 7 Biological Evaluation Form

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM for
Native Trout Restoration and Enhancement Projects in Southwest Utah

Originating Person: Kevin Sloan Telephone
Number: 303-236-4404 Date: March 22, 2007

I. Region: 6

II. Service Activity (Program):

Approval by USFWS Division of Federal Assistance, Region 6, for Federal Aid Grant to Utah Division of Wildlife Resources for Native Trout Restoration and Enhancement Projects in Southwest Utah

III. Pertinent Species and Habitat:

A. Listed species and/or their critical habitat within the action area:

Table 1. Threatened, Endangered, and Candidate species that may occur on the Fishlake and Dixie NFs.

Common Name	Fishlake R.D.*	Dixie R.D.**
Bald Eagle (Threatened)	D1, D2, D3, D4	D1 D2, D3, D4 DS
Utah Prairie Dog (Threatened)	D2, D3, D4	D2 D3, D4, DS
Mexican Spotted Owl (Threatened)	D2	D1 D2, D3, D4 DS
Mojave Desert Tortoise (Threatened)		D1
California Condor (Endangered)		D1 D2, D3, D4 DS
Virgin River Chub (Endangered)		D
Woundfin (Endangered)		DI
Western Yellow- Cuckoo (Candidate)	D1, D2, D3, D4	D1 D2, D3, D4 DS
Aquarius Paintbrush (Candidate)	D2	D4 D5
Rabbit Valley Gilia (Candidate)	D2	DS
Towsendia aprica (Threatened)	D2	DS
Maguire daisy (Threatened)	D2	
San Rafael cactus (Endangered)	D2	

*Fishlake N.F.: D1=Fillmore R.D., D2=Fremont R.D., D3=Beaver R.D., D4=Richfield R.D.

**Dixie N.F.: D1 = Pine Valley R.D., D2 = Cedar City R.D., D3 = Powell R.D., D4 = Escalante R.D., DS = Teasdale R.D. (now combined with the old Loa R.D. of the Fishlake N.F. to form the Fremont R.D.)

B. Proposed species and/or proposed critical habitat within the action area: None

C. Candidate species within the action area: Western Yellow-billed Cuckoo; Aquarius Paintbrush; Rabbit Valley Gilia

IV. Geographic area or station name and action:

The UDW R proposes to treat 10 streams and one marsh area during the period 2006-2011. Approximately 69 miles of stream and 100 acres of marsh are proposed for treatment. (Table 2)

Table 2: Waters proposed for chemical treatment. Maps showing specific project locations are located in Appendix A.

Water	Location	Approx stream length / Reservoir area	Target species / Comment	Objective
Cottonwood Creek	T 33S, R 21/2W Garfield Co.	2 miles	NA / Stream is likely fishless and rotenone treatment may not be required. Barrier construction may be	Establish Bonneville cutthroat trout
Deer Creek	T 32S, R 21/2W Garfield Co.	14 miles	Rainbow trout, nonnative cutthroat trout, brown trout. Barrier construction may be necessary.	Establish Bonneville cutthroat trout
Fish Creek	T 26S, R SW, Note Co., Sevier Co.	14 miles	Rainbow trout, brown trout. / Barrier construction may be necessary.	Establish Bonneville cutthroat trout

Upper Colorado River

B. County and State:

Garfield, Beaver, Sevier, Piute Counties, Utah

C. Section, township and range:

See Table 2

D. Species/habitat occurrence:

A "No Effect" determination has been made for Aquarius Paintbrush, Rabbit Valley Gilia,

Maguire daisy, and San Rafael cactus for the 7 streams located on the Fillmore, Beaver, and Richfield Ranger Districts of the Fishlake National Forest. A "No Effect" determination has been made the Mojave Desert Tortoise, Virgin River Chub, Woundfin, Aquarius Paintbrush, Rabbit Valley Gilia, and Townsendia aprica on the Powell Ranger District of the Dixie National Forest.

Critical habitat has been designated on the Fishlake and Dixie National Forests for the Mexican Spotted Owl; however, none of this is on the Fillmore, Beaver, or Richfield Ranger Districts on the Fishlake National Forest or on the Powell Ranger District of the Dixie National Forest. The critical habitat on the Fremont River District of the Fishlake National Forest is located a considerable distance from the one project stream, Tasha Creek, on that district.

Bald Eagle

Bald eagles select isolated shoreline areas with larger trees to pursue such activities as nesting, feeding, and loafing. Nesting habitat usually includes dominant trees that are in close proximity to a sufficient food supply and within line-of-sight of a large body of water (usually within 0.25 mile of water). Nest trees include large, open-crowned ponderosa pines, Douglas fir, or cottonwood trees in areas that are relatively free of human disturbance.

During migration and at wintering sites, eagles tend to concentrate on locally abundant food sources and roost communally. Roost sites are usually located in stands of mature or old growth conifers surrounding open water. These large trees provide a certain amount of thermal cover from the elements within range of available prey items such as fish and waterfowl (summarized from Rodriguez 2006, Rodriguez 2004). Personal observations of the Forest Service and Utah Division of Wildlife Resources are that the only birds seen foraging for fish on the streams that make up the project area and similar smaller streams in the area are kingfishers and possibly herons.

Bald eagles occur in low elevation valleys in Utah during the late fall and winter months. They have been observed on the Dixie National Forest during the late fall and winter months. In 2004, two mature bald eagles were present at Panguitch Lake on the Dixie N.F. throughout the entire year. No evidence of nesting was observed there nor has it been documented anywhere else on the forests. There are no known recent records of Bald Eagle use on the project area streams on the western part of the Fishlake N.F. (Steve Flinders, district wildlife biologist, personnel communication).

VI. Description of proposed action:

The UDWR proposes to treat 10 streams and one marsh area during the period 2006-2011. Approximately 69 miles of stream and 100 acres of marsh are proposed for treatment. All fish would be temporarily eliminated from target waters. Native trout would be introduced into project streams following treatments to establish self-sustaining populations. Sterile hybrid trout may also be stocked at some locations for a limited period to provide sport-fishing opportunities while native trout become established. In the marsh, all fish would be removed and efforts would be made to keep carp at reduced densities in the future by manipulation of water levels. Finally, the UDWR proposes to construct fish migration barriers on streams where barriers do not currently exist to prevent re-colonization by nonnative fish that have been removed. These barriers would be authorized by future site-specific NEPA analysis and/or separate Decision Memos.

Liquid emulsifiable and powder rotenone (Liquid Rotenone, 5% Active Ingredient, EPA Registration No. 432-172; Powder Rotenone, 7.4% Active Ingredient, EPA Registration No. 6458-

6) would be used to treat target waters. Liquid Rotenone would be applied at a rate of 0.5 - 3.0 ppm. In ponds liquid rotenone would be dispersed from small watercraft using pressurized backpack spray units. On streams and canals, liquid rotenone would be applied using drip stations over a 3-24 hr period (Finlayson [et. al](#) 2000). Drip stations would be located at approximately 0.5-mile intervals. Pressurized backpack sprayers would be used to apply a diluted solution of the chemical to springs and backwater areas containing fish that were not effectively treated by boat or drip station. Rotenone powder may be used in addition to liquid when treating ponds or the marsh area. Powder Rotenone would be applied at 0.5 - 3.0 ppm as a wet slurry by boat or hand. Where necessary, the rotenone would be detoxified with potassium permanganate downstream from target waters to prevent impacts from occurring below the target area. Application of the chemical would be conducted by UDWR and USFS personnel certified as Non-commercial Pesticide Applicators by the Utah Department of Agriculture. Safety gear including rubber gloves, eye protection, protective coveralls and respirators would be used where appropriate.

Rotenone was selected as the chemical to use because of its effectiveness in controlling fish populations and its lack of long-term effects on the environment (Sousa et al 1987). Rotenone is a naturally occurring fish toxicant that is toxic to only fish, some aquatic invertebrates, and some juvenile amphibians at the concentrations planned for the project. It is not toxic to humans, other mammals, and birds at the concentrations used to remove fish. It has been widely used in the United States since the 1950's. UDWR has used rotenone successfully in many similar projects and has refined application techniques to minimize adverse side effects to the environment.

In general, waters would be treated in the fall to minimize impacts on non-target wildlife species (amphibians, insectivorous birds and bats). The fall treatment period would also minimize the impacts on sport fishing recreation. Where necessary waters would be treated on successive years to insure complete removal of target species. Approximately two waters would be treated per year, allowing completion of the overall project within five-six years.

Fish-migration barriers will be constructed at the downstream end of project stream reaches where naturally occurring or manmade barriers do not already exist. Barriers will generally consist of small check dams constructed of boulders and large rocks, creating a vertical drop of approximately 5 ft on the downstream side. Locations for barriers will be selected to utilize naturally occurring drops that can be enhanced and where the stream channel and floodplain is confined to minimize the size of the structure and the amount of water impounded behind the check dam/barrier. Where feasible, two barriers will be constructed near the downstream end of project stream reaches to help insure their effectiveness. In some instances, barriers may be created by modifying or enhancing structures such as culverts at stream crossings or diversion structures. All barrier construction will comply with laws, regulations, and permitting requirements of the State Engineer for stream channel alteration. Barrier materials would be taken from the ground surface, near the stream. The collection of these materials would not require excavation, stream alteration, or vegetation disturbance. If sufficient material is not available on site additional materials will be hauled to the barrier site from an approved source.

Stream barrier locations would be selected to minimize changes in stream gradient, hydraulic function, and water pooling. In addition, barriers would be constructed adjacent to existing roads where equipment access is acceptable, thus requiring little disturbance to surrounding areas. Riparian vegetation would be disturbed as little as possible during the construction of migration barriers. Areas where surface disturbance would occur will be restored to pre-project conditions. Barriers will not be placed in areas of cultural or historic significance, or in areas where sensitive,

threatened or endangered plants occur. Migration barriers are designed to operate under the natural fluctuations of a stream flow without routine maintenance. Barrier designs pose little, if any, threat to the natural stream system or its associated riparian area. Consequently, if a barrier failed no damage would result to the stream environment. Maintenance could include the adjustment or replacement of individual rock materials, but such work would be minor.

Following the second rotenone treatment and construction of fish migration barrier(s), native trout will be introduced into project stream reaches from "core" populations or from fish produced by UDWR native trout brood stocks. Sterile hybrids of species of nonnative trout may also be stocked at some locations following the treatments to provide sport fishing opportunities while native trout become established. All transfers or stocking of fish will comply with Utah State Department of Agriculture rules and UDWR policies.

One marsh area will be treated with rotenone to remove carp. All fish will be removed by the treatment.

Treated waters would remain open to fishing. All treatments will be preceded by news releases in local papers to notify the public of treatment sites and dates.

Projects will be implemented during the period 2006-2011.

VII. Determination of effects:

A. Explanation of effects of the action on species and critical habitats in Items III. A, B and C:

Bald Eagle

Direct and indirect effects:

Chemical treatment of these project waters would eliminate all fish from these bodies of water. Project implementation would likely occur in late summer or early fall. Bald eagles are generally not present at in the project areas during these times of the year.

Consequently, project effects to bald eagles would be limited in scope. Since the individual projects would be completed in a period of one or two days, there would not be any appreciable disturbance of eagle roosting sites. Although bald eagles feed on fish in some situations, wintering eagles in the project area also feed on carrion and rabbits. During past rotenone treatment projects at Otter Creek Reservoir, bald eagles were observed feeding on fish killed during the fall treatment until ice formed on the reservoir with no ill effects. These fish probably represented a supplement to the eagles' normal food sources during that period.

The temporary elimination of all fish within Redmond Marsh will slightly alter prey availability for any bald eagles in the area. Immediately following the treatment there will be an increase in prey availability, associated with the presence of fish carcasses in the marsh. Following desiccation of fish carcasses, fish prey availability at Redmond Marsh will be suppressed. During this time any bald eagles in the area may be displaced to other water bodies in the surrounding area, including Redmond Lake. With continued forage availability from Redmond Lake, and mammal prey such as rabbits and carrion from surrounding areas, the project areas should continue to provide good quality winter roosting habitat for bald eagles/ Improved marshland management provided by the reduced/controlled numbers of carp may help provide alternative prey such as carrion.

Water treated with rotenone is not toxic to birds. Additionally, fish killed by the rotenone are safe for eagles to ingest, and pose no risk to eagles (Finlayson et al. 2000).

B. Explanation of actions to be implemented to reduce adverse effects:

None

I. Effect determination and response requested:

A. Listed species/designated critical habitat:

Determination

Response Requested

No effect/no adverse modification (Species: Aquarius Paintbrush, Rabbit Valley Gilia, Maguire daisy, and San Rafael cactus, Mojave Desert Tortoise, Virgin River Chub, Woundfin, Aquarius Paintbrush, and Townsendia aprica)

X Concurrency

May affect, not likely to adversely affect species/adversely modify critical habitat (Species: bald eagle) X -Concurrency

*May affect, and is likely to adversely affect species/adversely modify critical **habitat***

(Species: none)

Formal Consultation

B. Proposed species/proposed critical habitat:

Determination

Response Requested

No effect on proposed species/no adverse modification of proposed critical habitat (Species: none)

Concurrency

Is likely to jeopardize proposed species/adversely modify proposed critical habitat (Species: none)

Concurrency

C. **Candidate species:**

Determination

Response Requested

Not likely to jeopardize candidate species (Species: none)

Concurrency

Is likely to jeopardize candidate species (Species: none)

Conference



Field Supervisor

Date

IX. **Reviewing ESO Evaluation:**

A. Concurrency

Nonconcurrency

B. Formal Consultation Required C. Conference Required
D. Informal Conference Required

Assistant Regional Director
Services, Region 6

Date Ecological