

# *Biological Assessment*

## *BLM / BLNWR Habitat Protection Zone*



**Bureau of Land Management  
Pecos District**

**Roswell Field Office  
Roswell, New Mexico**



(General Area of Habitat Protection Zone Looking Southeast Over Highway 70 From Above Dunahoo Hills)

**June 28, 2006**

## **BLM-Authorized Activities**

**within the**

### **Bureau of Land Management/Bitter Lake National Wildlife Refuge Habitat Protection Zone**

**Bureau of Land Management  
Pecos District – Roswell Field Office**

#### **LOCATION:**

**Chaves County, New Mexico  
Township 8 & 9 South, Range 24 & 25 East**

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#### **Introduction**

The purpose of this biological assessment (BA) is to review Bureau of Land Management-authorized actions (primarily oil and gas activities) within the Bureau of Land Management / Bitter Lake National Wildlife Refuge Habitat Protection Zone (BLM/BLNWR HPZ) in sufficient detail to determine to what extent current management may affect the endangered species listed below. This BA is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (ESA 6 USC 1536 (c)), and follows the standards established in the BLM's National Environmental Policy Act (NEPA) guidance and ESA guidance.

Five endangered species recently listed by the U.S. Fish and Wildlife Service (FWS) after the 1997 Biological Opinion (BO) for the Roswell Resource Management Plan (RMP) are:

**Roswell springsnail (*Pyrgulopsis roswellensis*)**

**Koster's springsnail (*Juturnia kosteri*)**

**Noel's amphipod (*Gammarus desperatus*)**

**Pecos assiminea (*Assiminea pecos*)**

**Pecos sunflower (*Helianthus paradoxus*)**

The following endangered species were covered in the 1997 Biological Opinion:

**Pecos gambusia (*Gambusia nobilis*)**

**Pecos bluntnose shiner (*Notropis pecosensis*)**

**Interior least tern (*Sterna antillarum athalassos*)**

## **Critical Habitat**

The action addressed within this BA is not adjacent to critical habitat for the Pecos assiminea. Critical habitat units are designated in portions of Pecos and Reeves Counties, TX. Final ruling on critical habitat for the Pecos assiminea was established by FWS on August 9, 2005 (FWS 2005). No critical habitat occurs on public land administered by the BLM within the action area; therefore, none would be affected.

The action is not adjacent to critical habitat for the Pecos bluntnose shiner. Critical habitat units are designated in portions of De Baca, Chaves and Eddy counties, New Mexico. Final ruling on critical habitat for the Pecos bluntnose shiner was established by FWS on February 27, 1987 (FWS 1987). No critical habitat occurs on public land administered by the BLM within the action area; therefore, none would be affected.

## **Consultation to Date**

The initiation of Section 7 consultation for the Roswell Draft (DRMP) was completed on November 8, 1991, when a list of endangered, threatened, proposed, and candidate species was requested. The FWS responded on December 12, 1991 (Cons. #2-22-92-I-056), and updated the list by memorandum date June 19, 1995.

Concurrent with the development of the DRMP, the BLM submitted a Biological Assessment Update for the Previous Land Use Plans, Plan Amendments, Environmental Analyses (1976-1987) and for the 1996 Roswell Resource Management Plan to the FWS in a letter dated July 9, 1996. This document also incorporated analyses and determinations for listed and candidate species for the DRMP.

The FWS responded in a memorandum dated August 29, 1996 (Cons. #2-22-95-I-102) and concurred with determinations of "no effect" or "not likely to adversely affect" for five listed species (black-footed ferret, brown pelican, American peregrine falcon, Mexican spotted owl, northern Aplomado falcon), but could not concur with determinations for four listed species (bald eagle, Arkansas River shiner, southwestern willow flycatcher, Kuenzler hedgehog cactus) due to insufficient information. The FWS acknowledged the findings of "may adversely affect" and a request for formal consultation for three listed species, the Pecos bluntnose shiner, Pecos gambusia, and interior least tern. Comments were not provided on the assessments for the candidate species Koster's tryonia (now Koster's springsnail), Roswell springsnail, Pecos assiminea, Pecos pupfish, swift fox, mountain plover, and Pecos sunflower.

The BLM submitted an Addendum to the BA that included supplementary information and discussions as requested by the FWS in a letter dated September 20, 1996. Based on the addendum, the FWS indicated in a memorandum dated September 25, 1996, that it was able to concur with the determinations of "not likely to adversely affect" for the bald eagle, Arkansas River shiner, southwestern willow flycatcher, and Kuenzler hedgehog cactus.

The final Biological Opinion for the Roswell RMP was provided by the FWS on May 14, 1997 (Cons. #2-22-96-F-102). In the opinion of the FWS, implementation of the Proposed RMP would jeopardize the continued existence of the Pecos gambusia and Pecos bluntnose shiner

unless the six elements of their prescribed “reasonable and prudent alternative” for the gambusia and shiner were also implemented. The proposed RMP would not likely jeopardize the continued existence of the interior least tern. The Record of Decision (ROD) to adopt the Roswell Approved RMP was signed on October 10, 1997, incorporating the reasonable and prudent alternatives into the plan (refer to Roswell Approved RMP).

The biological opinion for the Pecos gambusia RPA reads:

*"1. Use the best available hydrologic information to map the source and movement of water that supplies springs occupied by Pecos gambusia on the BLNWR and the Salt Creek Wilderness. Close the lands within the mapped area to oil and gas leasing unless or until BLM can demonstrate that mandatory protective measures will ensure no aquifer contamination.*

*➤2. For existing lease within the mapped area, apply appropriate measures taken from BLM's Practices for Oil and Gas Drilling and Operations in Cave and Karst Areas and any other appropriate measures to ensure no contamination of water that supplies springs occupied by Pecos gambusia on the BLNWR and the Salt Creek Wilderness. Use monitoring procedures that will detect any surface or subsurface accidents soon enough that they can be discovered and corrected before significant harm to the aquifer occurs.*

*➤3. Continue the policy contained in the Interim Oil and Gas Leasing EA (BLM 1995) of selling no new oil and gas leases on lands with 100-year floodplains, unless or until BLM can demonstrate that other mandatory protective measures will provide equivalent protection.*

*➤4. The Roswell DRMP/EIS (BLM 1994) contains proposed surface use and occupancy requirement for oil and gas activities in floodplains. It states, No surface occupancy would be allowed within floodplains or within 200 meters of the outer edges of 100-year floodplains, to protect riparian areas (Appendix 3). Change the wording of this sentence to indicate the purpose of the policy is to protect the integrity of the 100-year floodplain, not just riparian area within the floodplain.▶▶*

*5. Several possible exceptions are identified for the no surface occupancy policy identified above. Eliminate any exceptions that could contribute to potential contamination of Pecos gambusia habitat.*

*6. The Roswell Resource Area Proposed Resource Management Plan/Final Environmental Impact Statement (BLM 1997) contains 141 COAs (Appendix 4) for oil and gas operations and other activities. The COAs number 109-118 apply to floodplain development. Compile these COAs, other COAs that may apply to floodplain development, and any other applicable information into a single guidance document for availability to floodplain lease holders."*

In a BLM memorandum to the FWS dated February 20, 1998, the BLM requested re-initiation of Section 7 consultation on the RMP based on the incorporation of the reasonable and prudent

alternatives provided in the BO for the DRMP. The FWS responded in a memorandum dated April 28, 1998 (Cons. #2-22-96-F-102) stating:

“Incorporating the reasonable and prudent alternatives for the Pecos bluntnose shiner and Pecos gambusia into the Roswell Approved RMP and ROD and/or implementing any reasonable and prudent alternatives not requiring a land use decision removes any jeopardy for the Roswell Approved RMP.

There is no need to reinitiate consultation on the Roswell Approved RMP and ROD unless (1) incidental take of Pecos bluntnose shiner, Pecos gambusia, and/or interior least tern occurs as a result of agency actions; (2) new information reveals effects of the agency action that may impact listed species or critical habitat in a manner or to an extent not considered in the biological opinion dated May 14, 1997 (Cons. #2-22-97-F-102); (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the May 14, 1997, biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.”

The BLM is re-initiating consultation because five additional species have been listed within the lands covered by the 1997 RMP, which might be affected by BLM land management actions.

#### Consultation for the Shelly Federal Com #2 Proposed Gas Well

Concepts in the formulation of protective measures for oil and gas development with the Pecos gambusia groundwater source protection zone were initially portrayed in the Shelly Federal Com #2 gas well (EA #NM-060-2000-121). This was the first well proposed in the area of interest since the development of the habitat protection zone based on the hydrologic study conducted by Balleau Groundwater, Inc.

On June 16, 2000, Yates Petroleum submitted an Application for Permit to Drill (APD) for the Shelly Federal Com #2 gas well located within the proposed HPZ. An onsite inspection was conducted on the access road and well pad for the proposed well. In attendance were Cy Cowan, Regulatory Agent for Yates Petroleum Corporation, Richard Hill, Environmental Protection Specialist, and Dan Baggao, Wildlife Management Biologist, BLM. Coordination and consultation occurred specifically with the FWS at a December 5, 2000 meeting and field trip hosted by the Roswell Field Office concerning the proposed well site. Another onsite inspection was conducted on August 8, 2001 with Carrie Hernandez, FWS, Ecological Services Field Office, and Dan Baggao. A field reconnaissance of the HPZ area was also conducted during that visit.

The BLM developed the details for surface and subsurface protection in consultation with the FWS and representatives of the oil and gas industry. An EA was prepared for the proposed well including a BLM Preferred Alternative incorporating design features to meet the requirements of the Roswell RMP biological opinion (refer to attached EA #NM-066-2000-121). Mitigating measures were developed for the unlikely event of casing failure. In addition, the Roswell Field Office Well Drilling Requirements, Conditions of Approval,

Permanent Resource Road Requirements, and the special requirements derived from the EA were applied to the proposed action.

These measures were carried forward from the Shelly Federal Com #2 EA into the proposed HPZ EA. During the development of the HPZ EA, the BLM again consulted with the FWS and representatives of the oil and gas industry with the background of developing the Shelly Federal Com #2.

The issues and mitigation measures concerning the groundwater and Pecos gambusia habitat at the Refuge were discussed during the meetings and are reflected in the Drilling Requirements (casing and cement program) for this well. The comments and suggestions expressed during the onsite consultation and letters have been incorporated into the Shelly Federal Com #2 EA and subsequently into the HPZ EA approved on February 3, 2003. As of this writing, the Shelly Federal Com #2 has not been drilled by Yates Petroleum Corporation.

In addition, the Forest Guardians filed a Notice of Appeal dated March 3, 2003 for the Decision Record of the HPZ EA (IBLA Case 2003-159). Yates Petroleum also filed as intervenor on May 21, 2003. The cases were remanded back to the BLM by the Interior Board of Land Appeals on September 22, 2005 (IBLA Case 2005-185). The HPZ EA is currently being evaluated with consideration given to the newly-listed species through this BA. A new decision record would be issued allowing the BLM to implement design features and conditions of approval to meet with the objectives of the re-evaluated HPZ EA.

## **Current Management Direction**

### Implementation of Pecos Gambusia RPA's

BLM incorporated the Pecos gambusia RPAs into the Roswell Approved RMP by the ROD dated October 10, 1997. RPA #3 and #4 became BLM management policy by this action. The BLM closed unleased tracts within the 100-year floodplain of the Pecos River to all new oil and gas leasing. No new oil and gas parcels within the HPZ are being offered for lease by the BLM. As leases expire, either through lack of activity or as production ceases, the leases will not be offered for re-leasing.

Since 1997, the source and movement of water that supplies the springs occupied by the Pecos gambusia have been mapped (Wolford *et al.* 1999) to address RPA #1. The "Source-Water Protection Zones for Bitter Lake National Wildlife Refuge" authored by Balleau Groundwater, Inc., was completed in 1999. This report was used to map the BLM-managed surface acres and federal minerals within the HPZ groundwater protection zone.

In October 2002, the BLM prepared an environmental assessment (EA) to designate the BLM/BLNWR HPZ. The purpose of this document was to analyze the impacts of implementing the remainder of RPA #1 and #2 which include the impacts of closing lands within a designated area to oil and gas leasing, and the application of protective measures and design features to existing lease developments. The need for this environmental assessment was also evident by the presence of other special status species occupying the same springs as the Pecos gambusia. The Decision Record for the EA (NM-060-2000-030) was signed on

February 3, 2003, implementing the HPZ and the development concepts of Alternative A (see attached HPZ EA).

The protection measures for development of existing leases within the HPZ were developed in consultation with the FWS and representatives of the oil and gas industry. The details were initially developed in the Shelly Federal #2 Well and brought forward and applied to the HPZ EA. The details to address RPA #2 include a casing and cementing program for all new wells in the HPZ that would seal off the aquifers and prevent hydrocarbons from communicating with the strata above them. A pressure gage is to be installed on these wells to detect possible leaks in the casing program. In addition, steel tanks will be used for wells within the groundwater source protection zone and within floodplains of the Pecos River.

Should a spill or leak occur, the process involves notification by the operator to the New Mexico Environment Department (NMED). The discovery of evidence of previous unauthorized discharges, such as contaminated soil or groundwater, also must be reported. NMED monitors clean-up and remediation. BLM's role is to report, assist and cooperate with NMED in these cases.

In 1997, the wording for Surface Use and Occupancy Requirements (SUOR) for oil and gas activities in floodplains was changed to reflect policy of protecting the integrity of the 100-year floodplain to address RPA #4.

A caveat to the exceptions for the no surface disturbance within up to 200 meters of the outer edge of 100-year floodplains was added to address RPA #5.

The SUOR now reads (added text underlined):

**Streams, Rivers and Floodplains:** Surface disturbance will not be allowed within up to 200 meters of the outer edge of 100-year floodplains, to protect the integrity of those floodplains . On a case-by-case basis, an exception to this requirement may be considered based on one or more of the criteria listed below. The first three criteria would not be applied in areas of identified critical or occupied habitat for federally listed threatened or endangered species.

- Additional development in areas with existing developments that have shown no adverse impacts to the riparian areas as determined by the Authorized Officer, following a case-by-case review at the time of permitting.
- Suitable off-site mitigation if habitat loss has been identified.
- An approved plan of operations ensures the protection of water or soil resources, or both.
- Installation of habitat, rangeland or recreation projects designed to enhance or protect renewable natural resources.

It was determined that the Roswell RMP would serve as the guidance document for oil and gas operations and other activities that may affect floodplains. Another separate document is not

necessary to meet RPA #6. The conditions of approval are disclosed in the RMP and other NEPA documents that may be developed, such as the EA for the Shelly Federal #2 and the HPZ EA.

BLM continues to implement the HPZ EA, including the application of design features to oil and gas exploration and development within the HPZ. In addition, habitat improvement and protection projects continue to be implemented to enhance the HPZ and include mechanical saltcedar control within the HPZ and along the Pecos River, prescribed fire in coordination with the BLNWR, indefinite deferment of livestock grazing authorizations on two previous grazing allotments, coordination with protective fencing projects with the New Mexico State Land Office, and other projects as appropriate to protect and enhance the HPZ.

Since the completion and approval of the Roswell RMP, five species were upgraded from proposed species status to federal endangered species status. This BA evaluates the impacts of potential oil and gas drilling activities authorized under the Roswell RMP for the newly-listed species, and re-visits listed species addressed in the RMP as requested by the U.S. Fish and Wildlife Service.

#### Implementation of Pecos Bluntnose Shiner RPA's

RPA #1 - Monitoring populations of bluntnose shiner has been coordinated and conducted with the FWS New Mexico Fishery Office beginning in 1997. An Intra-agency Agreement between the BLM, FWS, and Bureau of Reclamation was entered into that, in part, established a program to monitor the status of the fish community of the Pecos River. Pecos River fish community monitoring is an ongoing activity conducted by the FWS Fishery Resources Office with several survey sites located on public lands established through the initial Agreement. Surveys are conducted six times per year at twelve locations along the Pecos River.

RPA #2 – The North Pecos River (NPR) ACEC implementation plan has not been developed to date. Two other ACEC documents have been prepared for other important areas within the Roswell FO, the Ft. Stanton ACEC and Overflow Wetlands ACEC. An NPR implementation document will be prepared in the near future. Consideration will be given to the development of a strategic watershed management plan.

RPA #3 through #6 for the Pecos bluntnose shiner are very similar to the RPAs for the Pecos gambusia. These items are addressed above.

#### Implementation of Interior Least Tern Conservation Recommendations

The biological opinion for the Interior Least Tern Conservation Recommendations (CR) reads:

*"1. Conduct surveys for interior least terns during the breeding season in potential habitat on BLM lands.*

*2. If any breeding birds are found, develop a management strategy to protect the habitat. Management measures might include, but would not necessarily be limited to: (1) closure of the area to ORV use; (2) change of grazing regimes to remove cattle*



*during the summer breeding period; and (3) designation of no surface occupancy for oil and gas leases to prevent the building of roads into the habitat.”*

CR #1 – Potential habitat surveys were conducted for the presence of interior least tern by the New Mexico Natural Heritage Foundation in several areas of public land within the Roswell FO in 1997. Additional surveys were conducted in 1998 and 1999 for three areas deemed highly suitable nesting habitat, the Melena, Chain Lakes and Overflow Wetlands areas. Personnel from the U.S. Fish and Wildlife Service BLNWR conduct surveys on the Melena Allotment adjacent to and just north of the BLNWR Middle Unit as time permits. Rivers and Birds, Inc., through an annual breeding bird survey initiated in 2002 on several grazing allotments along the Pecos River, note any sightings of interior least tern. Surveys indicate that the Melena nesting site may or may not support nesting pairs on any given year. Rare sightings have occurred at the Overflow Wetlands. No birds have been reported by Rivers and Birds while conducting breeding bird surveys in the past three years. Potential habitat exists on public lands but due to the movement of nesting pairs, it is difficult to ascertain nesting occurrence at any given year without intensive surveys.

CR #2 – A breeding population was found on public lands within the Melena Allotment just north of the BLNWR. It is thought that breeding pairs may shift nesting locations between the Refuge and the Melena area. Administratively, public lands within the Melena Allotment are no longer authorized for livestock grazing. In addition, a State land section adjacent to the site has not been leased for livestock grazing by the State Land Office to assist with protecting habitat for the tern. A major access route to the site has been blocked by the Santa Fe & Atchison Topeka Railroad. Existing oil and gas leases are still held by production in the area. No new oil and gas leases have been offered by the BLM in the area, therefore a no surface occupancy stipulation has not been applied to leases.

### **Description of the Proposed Action**

The proposed action is to continue current management direction for the HPZ in light of the listing of the Roswell springsnail, Koster’s springsnail, Pecos assiminea, Noel’s amphipod, and Pecos sunflower as endangered species by the FWS, and to continue the implementation of the reasonable and prudent alternatives for the protection of habitat for the Pecos gambusia.

The HPZ is divided into a primary area of protection which includes public surface and minerals in which use authorizations may potentially affect the source-water capture zone for springs located on the BLNWR, and a secondary area of protection which includes public surface and minerals between the Salt Creek Wilderness and the BLNWR Middle Unit straddling the Pecos River.

All proposed oil and gas activities falling within the primary area would receive the full groundwater protection design features such as steel tanks and a stringent casing program as developed in the Shelly Federal Com #2. Proposed oil and gas activities in the secondary area would not be required to have steel tanks or required to follow the stringent casing program, unless other resource values dictate this level of protection. **Within the secondary area is the Pecos River and floodplain. Oil and gas activities would be required to follow the established protocol for oil and gas development on existing leases for proposed wells located within the**

floodplain. Gas well development essentially mirror those design features for the primary area of protection for the protection of floodplains.

Public land and minerals management would continue to receive special attention for all BLM-authorized actions within the entire HPZ. These activities include livestock grazing, rights-of-way construction, vegetation manipulation such as saltcedar control, prescribed fire, off-highway vehicle use, and other potential actions.

### Background for Oil and Gas Resources and Development

The leasable minerals within the area of interest are predominantly oil and gas. Producing wells in this area, and the surrounding vicinity, produce gas from the Abo formation. The aerial extent of Abo gas production has been estimated by one industry source as being approximately 900 square miles. The main field is known as the Pecos Slope Abo Field northeast of Roswell. The field is about 38 miles in length and about 15 miles wide. The reserves of the Pecos Slope Abo Gas Field have been estimated to be approximately 556 million cubic feet (MMCF)/well, or a total of approximately 3 trillion cubic feet of gas.

The Abo Formation, a lower Permian-age limestone, is a coarse-grained, dark red to purple combination of mudstones, sandstones, conglomerates, and limestones which occur in central, south-central, and southeastern New Mexico. The sediments which make up this formation were deposited along the course of a river and its delta approximately 275 million years ago during the early part of the Permian Period. The Abo siltstones and conglomerates of the upper member form the primary target for natural gas drilling in the Pecos Slope Abo Gas Field.

Natural gas comes from shallow accumulations which occur at an average depth of about 4,500 ft in the lenticular siltstone and conglomerate bodies of the Abo Formation. The natural gas is classified as a sweet, dry gas probably generated from the underlying marine Hueco Limestone. There are also possible minor contributions from the calcareous mudstones in the Abo itself.

The initial control for entrapment of the gas is interpreted as being stratigraphic, with the migrating gas being entrapped in the channel siltstones and conglomerates of the Abo. Tertiary faults subsequently created a secondary structural trap system wherein the gas has re-migrated and is concentrated in small structural-stratigraphic traps around the faults. Most of the gas has been sealed in the original stratigraphic traps. In the producing zones, permeability averages 0.04 millidarcies (MD, a customary unit of measurement of fluid permeability), and porosity averages six percent; average water saturation in the same zones is 61%. There is zero oil saturation.

To reach maximum productivity, Abo wells must be stimulated by first being acidized and then hydraulically fractured. Typical net pay ranges from 15 to 30 feet in thickness. A thorough description of the Abo facies can be found in *A Symposium of the Oil and Gas Fields of Southeastern New Mexico*, 1988 Supplement, published by the Roswell Geological Society, on file at the RFO.

A standard proration unit for wells drilled in the Abo field consists of a 160-acre spacing unit. This spacing was determined by the State of New Mexico Oil Conservation Division (OCD) for gas wells in formations younger than the Wolfcamp formation. However, Yates Petroleum Corporation has applied for, and received approval from, the OCD for an enhanced recovery project in the Pecos Slope Abo Gas Pool in Chaves County. The result of this approval means an additional well may be drilled within the standard 160-acre proration unit. The purpose of the recovery project was to evaluate additional data to determine the effectiveness of infill drilling to effectively and efficiently drain the Abo formation. Unconfirmed reports have indicated that the wells drilled have been successful.

For wells drilled on Federal Lands, an appropriate Application for Permit to Drill (APD), Form 3160-4, must be submitted for review and approval. The APD must include all attachments as outlined in the Onshore Orders. The APD must be posted for public review a minimum of thirty (30) days prior to approval. Subsequent site-specific EAs are completed for the APDs. The EAs would include the appropriate measures and design features to mitigate lease development, and may include relocating the proposed well greater than 200 meters from a proposed location.

### Drilling and Development Concepts of the Shelly Federal Com #2 Well

The Shelly Federal Com #2 was the first submitted APD that fell within the ground water protection zone for water sources at BLNWR since approval of the Roswell RMP. The following design features were applied to the well:

1. Access roads would be constructed without excessive grading or blading activities and would be limited to grubbing of vegetation and leveling of the access roads for a smooth running travelway. Gravel surfacing material would be utilized instead of caliche and placed on the minimally disturbed ground surface within the proposed road route. All other existing access roads would be maintained in as good or better condition than existed at the commencement of operations.
2. Well pads would be constructed without excessive grading or blading activities and would be limited to grubbing of vegetation and leveling of the pad. Gravel surfacing material would be utilized instead of caliche and placed on the minimally disturbed ground surface within the proposed well pad.
3. In lieu of lined earthen reserve pits, steel tanks would be used (see Roswell RMP, Appendix 3, page AP3-5). No reserve pit, or any other pits, would be constructed for the drilling activity. Above ground steel tanks would be used for drilling muds and would be located within the perimeter of the well pad. Utilizing steel tanks during drilling operation would prevent potential contaminants from leaching into the groundwater, and to reduce disturbance of fragile soils in the area. The tailings and muds contained in the steel tanks would be disposed at an authorized disposal site.
4. Casing is comprised of steel pipe of various diameters intended to prevent any transfer of fluids between the borehole and the surrounding formations. The casing would be set at different formations to protect the integrity of the well, and to seal off and protect the

groundwater aquifers. Progressively smaller diameter casing would be used during the drilling process, the borehole below each string of casing is smaller than the borehole above. The steel pipe casing would be placed in the borehole as drilling progresses to prevent the wall of the borehole from caving in, to prevent seepage of fluids, and to provide a means of extracting gas if the well is a producer. The operator would submit a casing and cementing program as part of the application for permit to drill (APD) approval. This program would be reviewed by a BLM petroleum engineer for adequacy.

5. A surface hole would be drilled to a depth sufficient to protect the fresh water aquifers using fresh water as the drilling fluid. Surface casing would be set at this depth and cemented in place. A volume of cement sufficient to circulate to the surface would be used. A cement slurry would be raised uniformly between the casing and the borehole. Ideally, the cement would completely and uniformly surround the casing and form a strong bond to the borehole wall while preventing the contamination of groundwater aquifers. This casing string would protect fresh water from the Quaternary Alluvium and Artesia Group. The surface casing would be pressure-tested prior to drilling any deeper and witnessed by a BLM petroleum engineer technician.

A volume of cement would be raised uniformly up from TD of each subsequent string of casing from total depth (TD) to the surface. A BLM petroleum engineer technician would monitor the actual circulation of cement and verify that the cement job was properly done.

The drilling fluids, also referred to as mud, may be a mixture of bentonite, barite, gypsum, fresh water, sodium chloride (salt water), and chemical additives. The mixture of different additives to the drilling fluids provides viscosity and density to the mud. In addition, the additives in the mud support the borehole walls from caving in, the mud (clay) deposits a cake plaster on the wall of the borehole to prevent loss of drilling fluids to the formations (seals permeable zones), and the mud also exerts hydrostatic pressure that serves to protect against blowouts by holding back subsurface pressures. When mud is being circulated, bottomhole pressure is the hydrostatic pressure required to help move the mud up the annulus. Once the wellbore is drilled, the mud along with borehole cuttings, are circulated back to the steel tanks.

Throughout the drilling phase, a driller's log or daily tour report would be maintained and used to report to the producer's operations staff of daily progress and occurrences during each driller's tour. It would show the hourly breakdown of time spent on various operations and records drilling rate at different depths, formation types, drilling breaks, lost circulation zones, when connections are made, when bits are changed, oil and gas shows, blowout preventer equipment (BOPE) tests, casing integrity tests, and other items. This information is used to monitor the drilling phase of the well and is made available to the BLM for review.

6. If the well is determined to be non-productive, no production casing would be set and appropriate cement plugs would be placed in the well bore to plug and abandon the well. This action would be evaluated upon receipt of a Notice of Intent to Plug and Abandon. At this time borehole data would be reviewed by a BLM petroleum engineer to determine the exact setting depths of the cement plugs. If the well is successful, and production casing is set, and the well will be completed for gas production.

7. If the well is a producer, a production packer would be placed on the production tubing and set above the perforations and a pressure gauge placed at the surface to monitor the status of the production casing during the life of the well. A production packer would seal off the production casing from the producing zone. This would allow monitoring for any internal casing leaks, which would register on the pressure gauge installed at the surface.

### Additional Conservation Measures

The following surface use and occupancy restrictions were developed in the Roswell RMP to protect streams, rivers, floodplains, and springs and seeps. No surface occupancy would be allowed within floodplains or within up to 200 meters of the outer edge of 100-year floodplains. No surface occupancy would be allowed within up to 200 meters of the source of a spring or seep, or within downstream riparian areas created by flows from the source or resulting from riparian area management. Produced water disposal pits on public lands would not be allowed on public land west of the Pecos River, within 100-year floodplains or within 200 meters of drainages or springs. OHV designations for the Pecos River floodplain include a combination of closed to OHV use and limited to designated roads/trails. The BLM would continue to evaluate actions with the HPZ and apply appropriate Best Management Practices (BMPs) for Fluid Minerals as necessary for resource protection. These can be found at [www.blm.gov/bmp](http://www.blm.gov/bmp).

The BLM is cognizant of the comprehensive conservation plan for BLNWR developed by the FWS (1998). Authorization of activities adjacent to the BLNWR and under the purview of the BLM will consider the mission of the National Wildlife Refuge System.

### **Action Area**

The primary area of interest is located approximately ten miles northeast of Roswell, NM via Highway 285 north and Highway 70 east. It is located on the upper terrace west of the Pecos River and generally runs northwest to southeast toward the BLNWR Middle Unit. A secondary and much smaller area is located on the northern boundary of the Salt Creek Wilderness Area administered by the BLNWR. **The HPZ encompasses an area of about 16,685 acres of federal surface estate and about 18,385 acres of federal mineral estate.** Refer to maps that are part of the HPZ EA.

### **Species Account and Status of the Species in the Action Area**

**Pecos Assiminea Snail** (*Assiminea pecosensis*)

**Roswell Springsnail** (*Pyrgulopsis roswellensis*)

**Koster's Springnail** (*Juturnia kosteri*)

**Noel's Amphipod** (*Gammarus desparatus*)

All four invertebrate species have only recently been described to science. Noel's amphipod was described as a new species in 1981 (Cole, 1981), whereas Roswell springsnail, Koster's springsnail, and Pecos assiminea were all described as new species in 1987 (Taylor, 1987).

These three snails and one amphipod are found in the same locations and share the same

threats and management needs. All four species are restricted to small, isolated, spring-fed aquatic and wetland habitats in the Pecos River drainage.

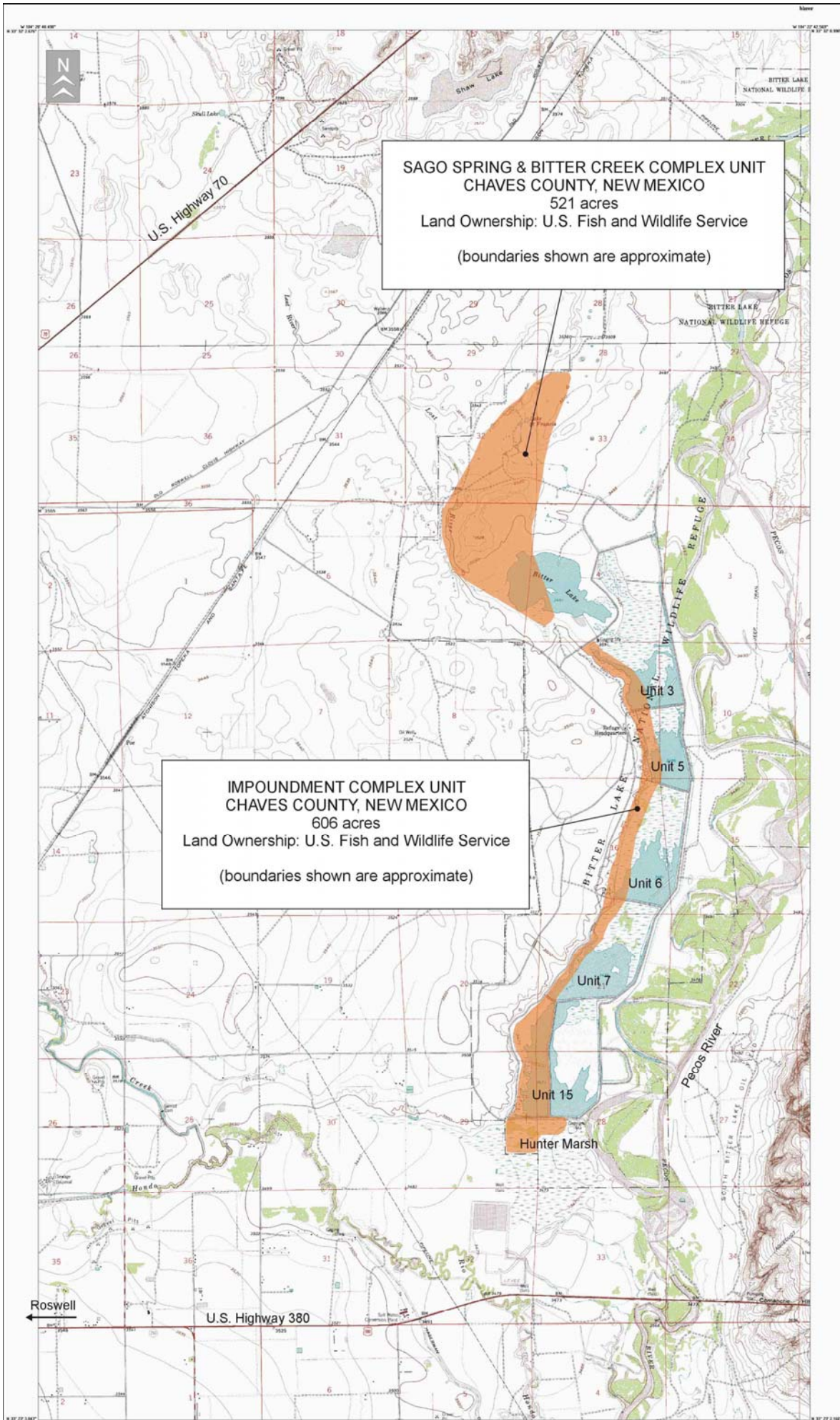
Pecos assiminea is in the family Assimineidae, and is unique in that it is the most inland species of the primarily marine genus *Assimineia*. Taylor (1987: 8-9) reported extirpation of two populations in Chaves County: one at North Spring on the Roswell Country Club and the other at the type locality on Bitter Lake National Wildlife Refuge. Populations on Bitter Lake National Wildlife Refuge currently are found in the upper reaches of Bitter Creek near Dragonfly Spring, the lower end of Bitter Creek near Bitter Lake, the lower reaches of the Sago Spring wetland complex near Sinkhole No. 32, very localized on the western perimeter of Unit 7, and at a spring in the extreme southwestern corner of Unit 15 (Lang, 2002: A5).

Roswell springsnail is in the family Hydrobiidae. The species persists at Bitter Lake National Wildlife Refuge. Current distribution of Roswell springsnail appears to be restricted to Bitter Lake National Wildlife Refuge. A survey of the Roswell Country Club conducted in 2004 indicated that Roswell springsnail is no longer present there (M. Myers, Service, pers. comm., 18 April 2005). Roswell springsnail persists in Bitter Creek, Sago Spring, Sinkhole No. 32, and along the western boundary of Unit 6 (Melhop, 1992; Melhop, 1993; Lang, 2002: A16). The type locality on the western boundary of Unit 7 was reported as being dry in 1992 (Melhop, 1992: 5), and Lang (1998:B69) confirmed that the species was no longer found there.

The current distribution of Koster's springsnail appears to be restricted to Bitter Lake National Wildlife Refuge. A survey conducted in 2004 indicated that Koster's springsnail no longer occurs at the Roswell Country Club site (M. Myers, Service, pers. comm., 18 April 2005). Therefore, the status of the population there is unknown. Koster's springsnail persists in Lake St. Francis, Dragonfly Spring, Bitter Creek, Sago Spring, Sinkhole No. 32, the southwestern corner of Unit 15, the northwestern border of Hunter Marsh, and in isolated locations along the western boundaries of Units 5, 6, and 7 (Melhop, 1992; Lang, 2002: A16). Koster's springsnail has not been found in recent times along the western boundary of Unit 3 (Lang, 2002: A16).

Noel's amphipod is a small freshwater crustacean. Noel's amphipod is in the family Gammaridae. Noel's amphipod currently persists on Bitter Lake National Wildlife Refuge at the Sago Spring wetland complex (including Sinkhole No. 32), Bitter Creek, and along the western boundary of Unit 6 (Lang, 1999: A1; Lang, 2002: A2). Noel's amphipod appears to be declining at Dragonfly Spring at the headwaters of Bitter Creek following the Sandhill Fire that burned through the area in March 2000 (Lang, 2002: A2).

There is no potential habitat for the Pecos assiminea, Roswell springsnail, Koster's springsnail and Noel's amphipod within the groundwater protection zone of the HPZ. No surveys have been conducted for these species within the groundwater protection zone due to the absence of habitat for these species. Outside of the groundwater protection zone but still within the boundary of the HPZ is an area known as Lloyd's Draw. This location supports a spring source on public lands that has been surveyed for invertebrates by the New Mexico Natural Heritage Program in the year 2000. No invertebrates of the phylum Mollusca were documented during the survey (NMNHP 2001).



**SAGO SPRING & BITTER CREEK COMPLEX UNIT**  
CHAVES COUNTY, NEW MEXICO  
521 acres  
Land Ownership: U.S. Fish and Wildlife Service  
(boundaries shown are approximate)

**IMPOUNDMENT COMPLEX UNIT**  
CHAVES COUNTY, NEW MEXICO  
606 acres  
Land Ownership: U.S. Fish and Wildlife Service  
(boundaries shown are approximate)

Roswell

U.S. Highway 380

### **Pecos Sunflower** (*Helianthus paradoxus*)

The Pecos sunflower is found along alkaline seeps and cienegas of semi-desert grasslands and the short-grass plains (4,000-7,500 feet elevation). Plant populations are found both in water and immediately adjacent to water sources where the water table is near the surface. The largest and most secure population is found on BLNWR.

The New Mexico Energy, Minerals and Natural Resources Division and BLM staff have conducted surveys along the Pecos River through riparian studies and during routine field reconnaissance over the years. The only known locations on public lands are Lloyd's Draw on the Leer (65137) BLM allotment, a small wetland area on Lynch (64059) & an un-named draw on the Hagelstein (65037) allotments, and a small wetland area at the Overflow Wetlands Area of Critical Environmental Concern.

No habitat currently exists with the groundwater protection zone of the HPZ. Potential habitat may now occur on the Melena Allotment (64056), situated between the Salt Creek Wilderness Area and the BLNWR Middle Unit, resulting from a large scale saltcedar control project conducted along the Pecos River in 2005.

Potential habitat occurs within the Overflow Wetlands ACEC. These wetlands are protected from surface disturbing activities and livestock grazing has been canceled on Allotment 65041. Livestock grazing on Allotment 64056 has been indefinitely deferred through the 1999 grazing authorization process. In addition, the 1999 livestock grazing authorizations for several riparian allotments included regulatory mechanisms to further protect potential habitat for this species. Site-specific evaluations would still be conducted on a case-by-case basis for all riparian areas for occurrence or monitoring when new populations are found.

### **Pecos Gambusia** (*Gambusia nobilis*)

The Pecos gambusia (*Gambusia nobilis*) was listed as endangered under the Endangered Species Conservation Act of 1969, and became an endangered species under the Endangered Species Act of 1973 when that legislation was enacted. No critical habitat has been designated. It is endemic to the Pecos River basin in southeastern New Mexico and western Texas. Natural populations within the Roswell Field Office area occur in several springs and isolated gypsum sinkholes at BLNWR. Introduced populations occur in other sinkholes at BLNWR, and at the Salt Creek Wilderness Area in Ink Pot sinkhole.

The Pecos gambusia is a small fish 25-40 millimeters long and is endemic to the Pecos River Basin in southeastern New Mexico and western Texas. Historically, Pecos gambusia occurred as far north as the Pecos River near Fort Sumner, New Mexico, and south to Fort Stockton, Texas. However, recent records indicate that its native range is restricted to sinkholes or springs and their outflows, on the west side of the Pecos River in Chaves County, New Mexico. In spite of population declines, the species remains locally common in a few areas of suitable habitat. In New Mexico, populations are present on the BLNWR and the Salt Creek Wilderness Area (both Chaves County). These areas constitute the key habitat of the species in the RFO area. Populations of Pecos gambusia occur in several springs and isolated gypsum



sinkholes at the BLNWR Middle Unit (Lake St. Francis Research Natural Area) and the Ink Spot sinkhole in the Salt Creek Wilderness.

**Pecos Bluntnose Shiner** (*Notropis simus pecosensis*)

Historically, the Pecos bluntnose shiner inhabited the Pecos River from Santa Rosa to near Carlsbad, New Mexico. Currently, the subspecies is restricted to the river from the Fort Sumner area southward locally to the vicinity of Artesia, and seasonally in Brantley Reservoir (NMDGF 1988; USFWS 1992). Routine fish community monitoring conducted by the USFWS in the Pecos River between Sumner Dam and Brantley Reservoir show the fish remains generally abundant, especially in light of cooperative efforts between the Bureau of Reclamation and the USFWS to more closely mimic natural flows in the Pecos River.

There are two designated critical habitat areas on the Pecos River within the RFO area. The first is a 64-mile reach beginning about ten miles south of Fort Sumner, downstream to a point about twelve miles south of the DeBaca/Chaves county line. The second reach is from Highway 31 east of Hagerman, south to Highway 82 east of Artesia.

Loss or alteration of habitat (periodic dewatering), and introduction of non-native fish species of the Pecos River (Arkansas River shiner) are the key threats to the Pecos bluntnose shiner. The primary threat to the Pecos bluntnose shiner appears to be artificial manipulation of flows in the Pecos River to meet irrigation needs and subsequent drying of the river channel (NMDGF 1996). High flows in the late winter-early spring before natural spring runoff appear to displace fish into marginal downstream habitats (including Brantley Reservoir). Cessation of reservoir releases after spring runoff, before the advent of summer rains, desiccates long stretches of the Pecos River. Maintenance of water levels within the Pecos River and its tributaries is beyond the management authority of the BLM.

In addition to the manipulation of flows is the threat posed by non-native fish. The introduction and establishment of species such as the Arkansas River shiner offers direct competition with the Pecos bluntnose shiner.

Fish communities between Sumner Dam and Brantley Reservoir are monitored by the FWS in coordination with the BLM and Bureau of Reclamation. Monitoring indicates a serious decline in Pecos bluntnose shiner density since 2002. Extensive river drying occurred in 2002 and 2003, and the river dried again for a short period in 2004. River drying is detrimental to the Pecos bluntnose shiner. In 2005, the species density was the lowest recorded since 1992 (FWS 2006).

**Interior Least Tern** (*Sterna antillarum athalassos*)

The interior least tern nests on shorelines and sandbars of streams, rivers, lakes, and man-made water impoundments. There are only three known nesting habitats in the Roswell Field Office (RFO) area. The primary areas are on the alkali flats on the east side of Unit 16 and around Bitter Lake on BLNWR. A secondary area is an alkali flat due north of the refuge on public lands on Allotment 64056. The third area is located on City of Roswell property at the old desalinization plant where terns once nested on the evaporation ponds behind the plant and

have since abandoned. No other nesting terns have been found to date. BLNWR is considered essential to tern breeding habitat in the state.

Sporadic observations of least terns have been recorded elsewhere in the Pecos River valley and they nested successfully at Brantley Reservoir in 2004. The tern may occur on public lands in Chaves County along the river because suitable nesting habitat is found on sites that are sandy and relatively free of vegetation (i.e., alkali flats). Other potential habitat sites are saline, alkaline, or gypsiferous playas that occasionally hold water. However, ephemeral playas do not support fish, the main staple for terns.

Specific surveys for nesting least terns have been conducted in potential habitat along the Pecos River and playas by the New Mexico Natural Heritage Program under a challenge cost share agreement with the BLM. Surveys were conducted at eight designated survey sites in the RFO area during the June/July 1997 season. A flyover was noted at the Overflow Wetlands ACEC, and two nesting pairs were observed on the Melena Allotment 64056 north of the BLNWR (NMNHP 1997). No other nesting terns have been found to date.

Channelization, irrigation, and the construction of reservoirs and pools have contributed to the elimination of much of the tern nesting habitat. Unpredictable flow patterns below reservoirs can pose problems for nesting terns. Increased human activity on river sandbars threaten nesting terns, including the use of recreational vehicles on previously unreachable habitat during periods of drought.

## **Effects**

Within in the source-water protection area of the HPZ (primary protection zone), are all or part of 17 oil and gas leases with 20 existing natural gas wells. The potential for further oil and gas development in order to fully develop a lease in accordance with well spacing requirements established by the New Mexico Oil Conservation Division (NMOCD) is projected to be approximately 66 wells. Within the area between the Salt Creek Wilderness and BLNWR Middle Unit (secondary zone), and outside of the source-water protection area, are all or part of 12 oil and gas leases with 25 existing natural gas wells. The potential for further oil and gas development in the entire HPZ comprising a total of 29 leases (both primary and secondary areas) in order to fully develop a lease, is projected to be approximately 91 wells.

Additional information describing the existing condition of oil and gas development is presented by the FWS in *Environmental Assessment for Designation of Critical Habitat for Roswell Springsnail, Koster's springsnail, Pecos assiminea, and Noel's amphipod*. A reference to the designation of the HPZ is made and generally describes protective measures for oil and gas well development (FWS 2005).

Individual gas wells usually do not result in negative impacts to wildlife or wildlife habitat due to the small area of disturbance in contrast to field or complete lease development. The magnitude of impacts from individual wells, associated roads and pipelines, depend on the proposed location of each development, mitigation developed during the permitting process, and constraints that may limit mitigation, such as lease boundaries or orthodox locations.

Typically, wells are staked at locations that are geologically selected, regardless of environmental considerations. An estimate of surface disturbance is about 1.9 acres per well pad having an average dimension of 275' x 300'. An estimate of surface disturbance for roads, based on an average road width of about 14' of driving surface x 2,640' (0.5 miles) in length, is about 0.85 acres. Pipeline surface disturbance would approximate road disturbances. A total average surface disturbance for the example above is about 3.6 acres per producing well.

The Oil Conservation Division of the New Mexico Energy, Minerals, and Natural Resources Department regulates oil and gas well drilling and casing in part to prevent contamination of groundwater (19 NMAC 15.3). For example, regulations at 19.15.3.106.A (Sealing Off of Strata) state that "During the drilling of any oil well, injection well or any other service well, all oil, gas, and water strata above the producing and/or injection horizon shall be sealed or separated in order to prevent their contents from passing into other strata."

The casing and cementing procedures used in drilling a gas well are designed so that drilling fluids (mud) are contained within the casing/cemented borehole and are not allowed to discharge into underground aquifers. When completed, two strings of casing and two cement sheaths, from the Glorieta formation (1260') all the way back to the surface, would be in place.

A pertinent point to drilling a gas well is how the formation pressure mechanism works in reverse; gas pressure pushes up instead of down into the borehole and consequently not into the formations and the water table. The pressure energy from the producing formations would prevent the inverse suction of drilling fluids from entering into those formations and would not allow any drilling fluids from being released or escaping into the underground aquifers.

The impact from drilling fluid contamination is minimal since downhole pressures would prevent drilling fluids from entering the underground aquifers. The impacts to the aquifers would be minimized by the proper cementing of casing in the borehole. Once the well is completed, the casing and cement would provide adequate protection to groundwater resources by sealing off aquifers, and preventing seepage from the borehole into the underground aquifers. Monitoring the well for casing integrity would alleviate potential impacts to groundwater sources that could affect significant springs and sinkholes at the BLNWR.

However, there is a remote possibility that drilling fluid contamination could occur during the drilling phase. If this happens, the effects would be very minimal because the use of steel tanks would protect the surface from mud contamination and the borehole casing program would protect the sub-surface aquifers from the possibility of mud contamination. In addition, the travel time for contaminants (10 to 500- year source zone) would afford a substantial response time to mitigate potential impacts. The drilling of a well is of a short duration. Usually the amount of time it takes to drill or complete the well is typically two weeks but may take up to four weeks.

Produced fluids (e.g.: saltwater, oil, and/or condensate) could cause permanent damage to soils and vegetation off the well pad in the event of a breach, overflow, or spill from storage tanks associated with production facilities on the well pad. However, the probability of impacts from

produced fluid are reduced because of the requirement for the use of steel tanks to contain all drilling fluids and the production requirement of tanks, and berms.

Containment Structure Requirements that are applied to APDs as a Condition of Approval:

1. A containment structure or earthen dike shall be constructed and maintained around all storage facilities/batteries. The containment structure or earthen dike shall surround the storage facilities/batteries.
2. The containment structure or earthen dike shall be constructed two (2) feet high around the facilities/batteries (the containment structure or earthen dike can be constructed higher than the two (2) feet high minimum).
3. The perimeter of the containment structure or earthen dike **can be** constructed substantially larger for greater holding capacity of the contents of the largest tank.
4. The containment structure or earthen dike shall be constructed so that in case of a spill the structure can contain the entire contents of the largest tank, plus 24-hour production, within the containment structure or earthen dike, unless more stringent protective requirements are deemed necessary by the Authorized Officer.

The Roswell Field Office's Well Drilling Requirements, Conditions of Approval, Permanent Resource Road Requirements, and the special requirements derived from this EA, would be applied to this proposed action to minimize the surface disturbance and conserve the surrounding landscape. The protective measures described for the borehole casing and cementing process are requirements in the drilling phase that would sustain the integrity of the well and would also be sufficient for the protection of aquifers. The risk of ground water contamination, though not great, is further reduced by implementing the proposed protective measures. The BLM would monitor surface activity to detect any surface accidents soon enough that they can be discovered and corrected before significant harm to the underground aquifer can occur. The gauge placed at the surface would allow monitoring of pressures within the production casing that may indicate problems with the casing.

Future oil and gas development would initially result in the site-specific direct loss of wildlife habitat. Oil and gas *field* development would have negative, long-term cumulative impacts to wildlife habitat due to the magnitude and concentration of surface disturbances, such as oil and gas pads, pipelines, access roads, power lines, and associated human activity in the area. Wildlife habitat would be afforded protection from oil and gas development on parcels removed from lease sales. The HPZ would continue to be impacted by development of existing oil and gas leases.

The probability of contamination of groundwater resources supplying springs at the BLNWR from oil and gas development is very remote. The probability of an accident occurring increases as the number of producing wells are developed in the area. The potential for affecting special status species, particularly aquatic species, is highest within the groundwater protection zone and Pecos River.

## **Cumulative Effects**

The effect, in terms of leasing and development, is a reduction in the number of leases offered for sale over a long period of time. The cumulative effect of this would be negligible over the long term because of the small number of leases that would be affected within the habitat protection zone, and the fact that all current leases are presently held by production.

Development of existing leases would not vary from the current situation. Adjacent private and state lands would continue to undergo oil and gas lease development. Private lands are immediately adjacent to the northwest boundary of the BLNWR Middle Tract. A current State lease within the surface drainage area has been drilled for Abo gas. BLM does not have the mineral estate for private lands and development for oil and gas pose a more immediate threat to the Refuge.

Habitat and groundwater resources on private and state lands are even more subject to impacts because they are not afforded the level of protection given to adjacent public lands. Thus, the public lands are even more valuable for the maintenance of habitat for a variety of wildlife species, natural communities and groundwater resources as adjacent lands may be developed without the special considerations that the BLM applies to federal actions.

Surface disturbance from well pads, roads and pipeline rights-of-way would continue at the pace that was analyzed in the reasonable and foreseeable development found in the Draft Roswell RMP. Mitigation measures for these impacts are found in Appendixes 2 and 5 of the Roswell RMP, and the Preferred Alternative of EA # NM-066-00-121.

In general, full oil and gas lease development may have negative, long-term cumulative impacts to wildlife habitat due to the magnitude and concentration of surface disturbances, such as oil and gas pads, pipelines, access roads, power lines, and associated human activity in the area associated with full lease development. In the short term, existing and new developments would not be fully reclaimed, and portions would remain unusable for wildlife, for 20 years or more.

In the foreseeable future, lease holders could accelerate the development of the lease resulting in more wells that could accumulate to a substantial reduction of habitat. Well development mitigation measures would greatly reduce, but may not completely eliminate accidental spills or casing failures that could contaminate the aquifers. While it is unlikely that there will be significant cumulative effects from individual actions, continued oil and gas lease development, and other surface-disturbing activities in this area, may potentially have cumulative impacts on vegetation, soil, water, air, and wildlife. In the long term, the cumulative impacts from oil and gas activities would be reduced as the wells play out and the lands are reclaimed.

Located in the area of interest are other developments which pose an even greater risk for surface and subsurface contamination, such as the growing subdivision located one mile west of the BLNWR, the Atchison Topeka and Santa Fe Railroad, and Highway 70. At the present time, the BLM does not own either the surface or the mineral estate to lands located immediately adjacent to the BLNWR. These lands pose a much greater and immediate threat

to the species of concern. The New Mexico Department of Game and Fish (NMDGF) developed a conservation plan for the four invertebrate species. An account of potential groundwater contamination is presented which include potential impacts from septic tanks, trash dumping in dry sinkholes and residential development (NMDGF 2005).

### **Species-Specific Effects**

The specific actions proposed by an oil and gas lessee or operator to develop an existing lease may potentially affect special status species and their habitat. The potential for affecting special status species, particularly aquatic species, is highest within the groundwater protection zone and Pecos River. At this level of analysis, the BLM cannot accurately predict where locations for projects (e.g., wells, roads, pipelines) would occur on existing leases, or how projects would affect or not affect a listed species.

The magnitude of impacts would depend on the specific location of a project, mitigation developed during the permitting process, and constraints that may limit mitigation such as lease boundaries or un-orthodox locations possibly pre-empting relocation of the proposed well. Each proposal would be scrutinized for possible impacts to special status species.

The possibility of a ►may affect► or other determination exists with individual projects, which may lead to informal or formal Endangered Species Act consultation with the USFWS, if the implementation elements found in this BA for all proposed wells in the source-water protection zone of the HPZ are not applied.

**Pecos Assiminea Snail** (*Assiminea pecosensis*)

**Roswell Springsnail** (*Pyrgulopsis roswellensis*)

**Koster's Springsnail** (*Juturnia kosteri*)

**Noel's Amphipod** (*Gammarus desparatus*)

These species do not physically occur within the HPZ and are known only to occur within the boundary of the BLNWR. Protection measures for the Pecos gambusia through groundwater protection requirements as described in the HPZ EA would also protect habitat for these species. The probability of contamination of groundwater resources supplying springs at the BLNWR from oil and gas development is very remote. The probability of an accident occurring increases as the number of producing wells are developed in the area. The chance of this occurring is reduced from the application of design features to an oil and gas well development proposal with the groundwater protection zone of the HPZ.

Effect Determination: May Affect, Not Likely to Adversely Affect.

**Pecos Sunflower** (*Helianthus paradoxus*) – Within the groundwater protection zone, there would be no impact to the Pecos sunflower as populations do not currently occur within the groundwater protection zone portion of the HPZ. **There are potential sites along the Pecos River and Lloyd's Draw that are within the boundary of the HPZ, these sites would be avoided by relocation of a proposed oil and gas well to eliminate impacts to the sunflower and potential habitat.**

Effect Determination: May Affect, Not Likely to Adversely Affect. The effects of the proposed action has adverse aspects that are discountable or insignificant.

**Pecos Gambusia** (*Gambusia nobilis*) – As with the original HPZ EA, the effect determination would remain May Affect, Not Likely to Adversely Affect.

**Pecos Bluntnose Shiner** (*Notropis simus pecosensis*) – Within the groundwater protection zone, there would be no impact to the Pecos bluntnose shiner as populations do not occur in this area of the HPZ. A section of the Pecos River is within the boundary of the HPZ. Proposed oil and gas well development on existing leases would be required to follow the design features to protect floodplains to eliminate impacts to the Pecos bluntnose shiner and habitat. There would be no impact to designated critical habitat for the bluntnose shiner as none are designated within the HPZ. No new leases will be authorized within the floodplain of the Pecos River.

Effect Determination: May Affect, Not Likely to Adversely Affect. The effects of the proposed action has adverse aspects that are discountable or insignificant.

**Interior Least Tern** (*Sterna antillarum athalassos*) - Within the groundwater protection zone, there would be no impact to the interior least tern as populations do not currently occur in this area of the HPZ. A section of the Pecos River is within the boundary of the HPZ. Proposed oil and gas well development on existing federal leases would be required to follow the design features to protect floodplains to eliminate impacts to the interior least tern and habitat, such as timing stipulations, relocation of well pads, access routes and facilities, and immediate rehabilitation actions to include rehabilitation and closure of access roads.

Effect Determination: May Affect, Not Likely to Adversely Affect. The effects of the proposed action has adverse aspects that are discountable or insignificant.

## **Conclusion**

At the current rate of development, the ground water supplying the springs on BLNWR would be protected from possible hydrocarbon contamination by the casing and cementing programs and other design features for approval of wells located within the groundwater protection area. Further, the monitoring program would allow detection and remediation of possible leaks. There are no known instances of groundwater contamination by leaking oil or gas wells in the source-water capture zone for the Middle Unit of Bitter Lake National Wildlife Refuge. Measures to protect Pecos gambusia which co-occurs with the four invertebrate species would likely be comprehensive enough to ensure protection of the four invertebrate species as well.

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## **Attachments**

### Maps

BLM / BLNWR Habitat Protection Zone Map

BLM / BLNWR Oil and Gas Mineral Ownership Map

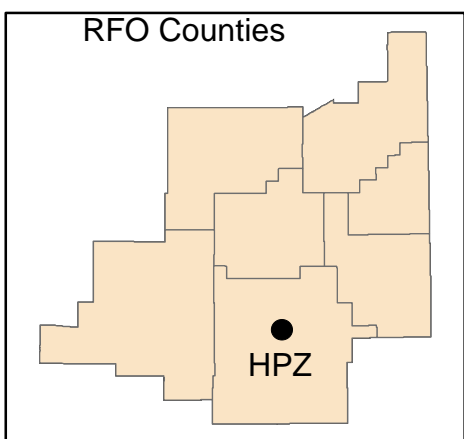
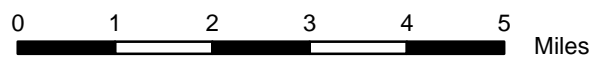
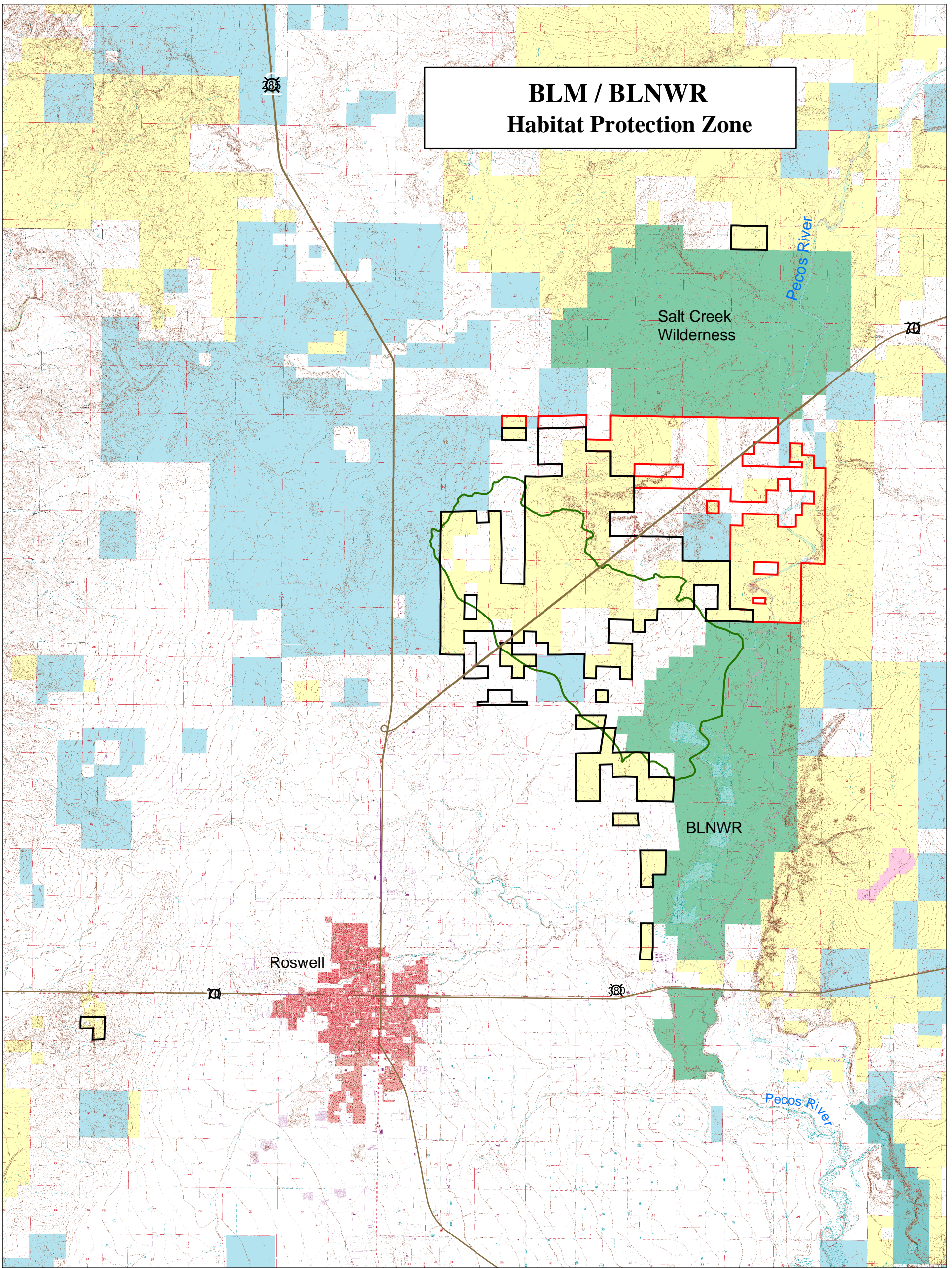
BLM / BLNWR Oil and Gas Leases and Wells Map

### Documents

Shelly Federal Com #2 Environmental Assessment EA# NM-060-2000-121

Habitat Protection Zone Environmental Assessment EA# NM-060-2000-030

# BLM / BLNWR Habitat Protection Zone



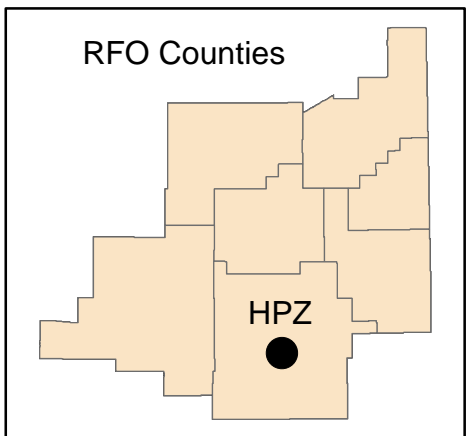
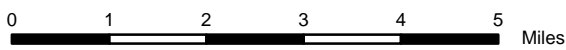
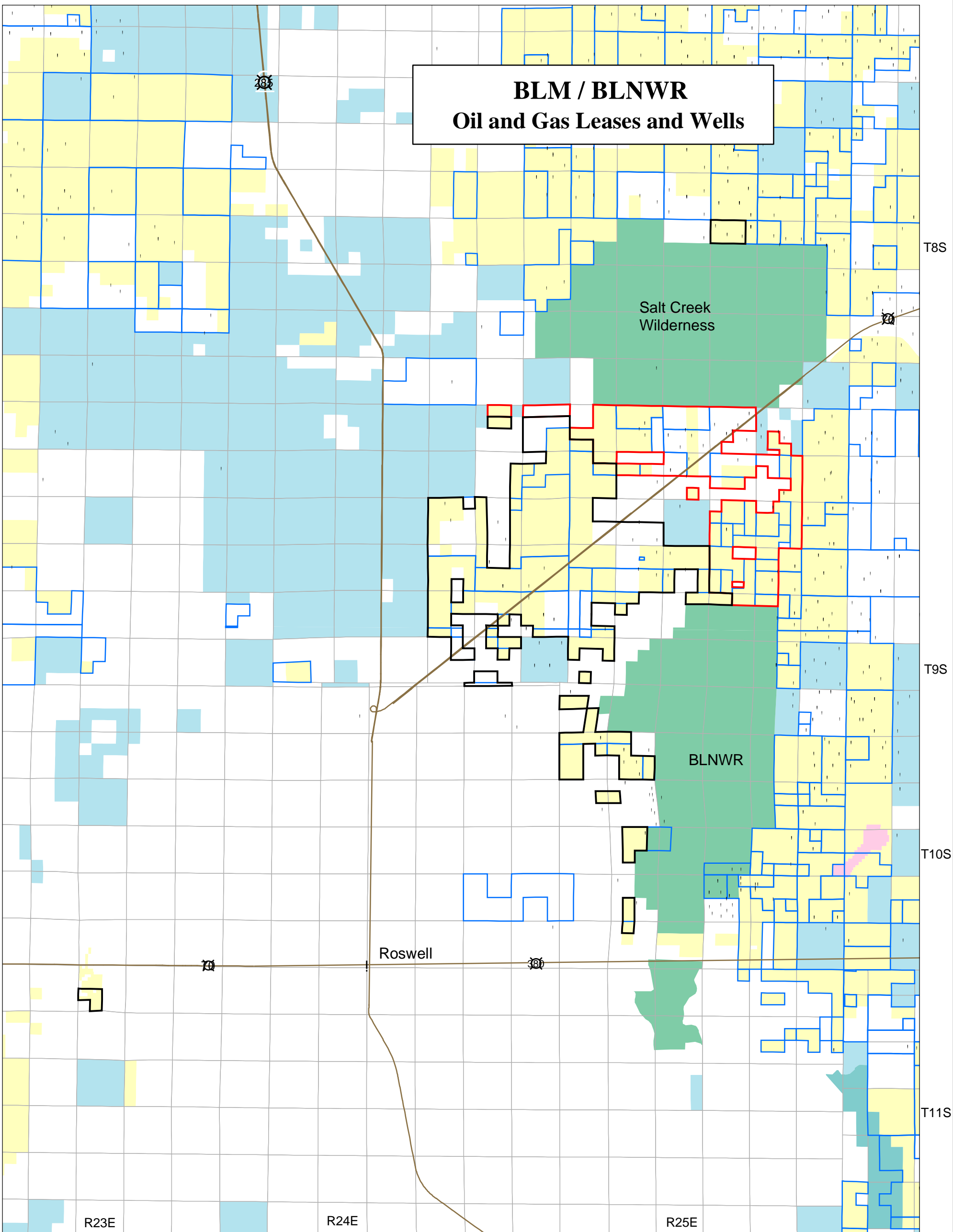
- Public
- Private
- Fish & Wildlife Service
- State
- State Park
- Dept. of Defense
- Primary Habitat Protection Zone
- Secondary Habitat Protection Zone
- Surface Drainage Area to Pecos
- Gambusia Habitat



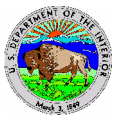
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# BLM / BLNWR Oil and Gas Leases and Wells



- Public
- Private
- Fish & Wildlife Service
- State
- State Park
- Dept. of Defense
- Primary Habitat Protection Zone
- Secondary Habitat Protection Zone
- Oil and Gas Leases
- Oil and Gas Well Locations



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