# Supplement to the San Juan DEIS

# Appendix T-Biological Evaluation

***NOTE TO READER: The DEIS Appendix T has been updated to support the Supplement to the DEIS, which was completed to update the development projections for the Gothic Shale Gas Play (GSGP) area. The following list of species could be affected by the GSGP development projections. Only the Mammals, Birds, and Fish listed below have been updated (i.e., have new, changed information from the 2007 BE that was published with the DEIS), as they are the only species that could be affected by the new GSGP development projections.***

# Mammals

**Allen's big-eared bat** *(BLM Sensitive)*

**Big Free-tailed Bat (***BLM Sensitive***)**

**Fringed Myotis** *(BLM and FS Sensitive)*

**Gunnison's Prairie Dog** *(FS sensitive)*

**Spotted Bat** *(BLM and FS sensitive)*

**Yuma Myotis** *(BLM sensitive)*

# Birds

**Gunnison Sage-grouse** *(BLM sensitive)*

# Fish

**Roundtail Chub** ***(Gila robusta***)

**Flannelmouth Sucker** ***(Catostomus latipinnis***

**Bluehead Sucker** ***(Catostomus discobolus*)**

# Introduction

Lease stipulations have been developed to, and would be prescribed to, avoid critical habitats and/or to address critical life history needs such as protection of habitat during specific times of year.

Impacts due to oil and gas development will vary depending on the species requirements. For example, a species that utilizes early successional habitats may benefit from vegetation clearing for a period of time. The opposite may be true for species that utilizes mature vegetative conditions or are sensitive to associated development activities. Generally, impacts to wildlife increase with increasing density of development and may surpass threshold conditions affecting a species habitat use and population numbers. Some effects are site specific and cannot be assessed at this planning level. As oil and gas development progresses to project specific actions another stage of field analysis is conducted to minimize or reduce impacts to wildlife.

The stipulations vary by alternative, with alternative A being the least stringent leasing stipulations, and in many cases having no similar requirements as the other alternatives utilizing standard lease terms to guide development instead of the wildlife leasing stipulations designed for specific species which apply to alternatives B, C, and D. Development under alternative A, B, C, and D will, however, still be in compliance with all DLMP components including standards and guidelines as well as other referenced guidance concerning wildlife. These requirements will affect the way projected development in the GSGP area can occur. DLMP components including other referenced guidance essentially place the same requirements on development under alternative A as would be found under the leasing stipulations, Appendix H, which apply to alternatives B, C, and D. These would be addressed under subsequent NEPA analysis for proposed development.

Overall under leasing stipulations at the leasing stage, Alternatives B, C and D provide for the most protective lease stipulations and Alternative A (continuation of current management) the least. Each stipulation has an associated standard and guideline or other supporting management direction such as species conservation strategy or set of best management practices. However, when considering all development requirements, all four alternatives protect and provide for each species life history characteristics when considering alternative A as well as B, C, and D must also meet DLMP component requirements which include standards and guidelines and other referenced guidance.

In addition to the lease stipulations above, the standards, guidelines and additional management direction, provide comprehensive direction that are used during project implementation to reduce wildlife impacts resulting from management activities. Management standards, guidelines for wildlife (DLMP pgs. 259 - 268) and guidance contained in agency manuals, handbooks, conservation strategies and other referenced materials cited below are utilized in oil and gas management and would be applied as COA's at the project level in order to protect, enhance, and, where appropriate, improve resources related to terrestrial wildlife and wildlife species.

This analysis includes projected development of the Gothic Shale formation and supplements the analysis found in the BE analysis found in Appendix T of the DEIS. The Gothic Shale would develop as a field of approximately 400 federal well pads on new leases, impacting approximately 2,200 acres, within an area of approximately 354,800 acres. The progression of development would require an exploratory phase of approximately four years followed by full field development in which over 100 wells would be drilled per year.

### All Alternatives

There is generally less than 5 percent change in well numbers or acres removed from habitat between the lease alternatives (A, B, C, D) having minor change in impacts between the alternatives. However, there are varying levels of impacts for the lease alternatives to wildlife and habitats due to the overall magnitude of projected development and associated activities within the Gothic Shale.

Unmitigated potential development of the RFD could have major impact to some wildlife species habitats and populations. The requirements of the DLMP components and leasing stipulations will mitigate those impacts, being minor in most cases. These requirements will affect the way potential development can occur across the landscape where federal minerals occur within the Gothic Shale. These requirements could also affect the ability for industry to achieve RFD potential development levels and schedules utilizing current technologies for development. Impacts to wildlife would be greatest onsite and primarily related to human disturbance, direct habitat loss, and fragmentation influences. Construction impacts would be reduced by applying the lease stipulations, best management practices, conservation procedures, and meeting DLMP components as conditions of approval. These lease stipulations and DLMP components require crucial habitat avoidance for some species and/or timing limitations that apply to important life history periods for certain wildlife species of concern.

## Mammals

### Allen's big-eared bat *(BLM Sensitive)*

**Natural History and Background:** Allen's big-eared bat (*Idionycteris phyllotis)* occurs in southwestern United States to central Mexico (Adams 2003). In the Rocky Mountain region, it occurs in southern Utah throughout most of Arizona and into southwestern New Mexico. Fitzgerald et al. (1994) mention Allen's big-eared as a species of probable occurrence in Colorado. The species has been reported in southeastern Utah from pinyon-juniper woodlands close to the Colorado border (Armstrong 1974 and Black 1970, cited in Fitzgerald et al. 1994). The animal can be expected in extreme southwestern Colorado (Fitzgerald et al. 1994). Known elevation is from about 1,100 to 3,255 meters (3,500-9,800 feet) (Fitzgerald et al. 1994).

The species has been reported on BLM lands near Dolores, Colorado where it has been detected using canyon habitat along the Dolores River (K. Nickell, pers. comm.). Preferred roosting habitat (crevices on rocky cliffs) is absent from the area, but exists on adjacent lands.

The biology of this species is poorly known. The species inhabits mountainous areas and is commonly found in pine-oak forested canyons and in coniferous forests. It has been found in low elevation ponderosa pine forests, pinyon-juniper woodlands, on occasion in high elevation white fir forests, in areas with narrow leaf cottonwood (Adams 2003). The species forms day roosts in rock crevices, caves, and mines and therefore typically prefers areas associated with cliffs, outcrops, boulder piles, or lava flows. Emergence from day roosts begins well after dark, and serial foraging takes place approximately 10 meters (33 feet) above the ground. Roosts may be shared with other species such as fringed myotis, and Townsend's big-eared bat. Allen's big-eared's use both aerial foraging and gleaning to hunt primarily small moths; however soldier beetles, dung beetles, leaf beetles, roaches, and flying ants also compose the diet.

Little is known about the reproductive biology of the species. Maternity roosts can occur in pine snags, on boulders beneath rock shelters, and in mine entrances (Adams 2003). A single young is born in June or July. Winter ecology of this species is also little known, but single individuals have been observed hibernating in northern Arizona in a cave within pinyon-juniper woodlands habitat (Hoffmeister 1986, cited in Adams 2003).

Maternity roosts appear to be the critical limiting factor (O'Farrel 2003). Use of abandoned mine tunnels put the bats at risk; abandoned mines are subject to closure or vandalism. It is critical that proper forest management provides sufficient roosts for this species. The rarity and patchy distribution of this species, as well as it apparent high degree of specialized feeding strategy compounds its sensitivity to disturbance (O'Farrel 2003). Disturbance to maternity roosts from June through July may be limiting.

**Effects Analysis:** Plan Revision activities that could potentially influence Allen's big-eared bat involve fluid minerals development and wildlife management (i.e. abandoned mine closures using bat gates).

***Direct/Indirect Effects:*** Allen's big-eared bat has an echolocation call that is audible to humans. As such, individuals have been detected while foraging along the far western edge of BLM lands near the Utah border. It is possible that an individual will eventually be captured leading to documented occurrence of individuals in Colorado. It is also possible that a roost or maternity site will eventually be found in western Colorado and provide more insight on this species. To date, however, the species is extremely rare in Colorado with no breeding sites or important habitat elements found. Impacts to these areas are therefore unlikely and cannot be predicted or measured at this time.

In regards to activities that could potentially influence Allen's big-eared bat, Alternative A offers approximately 28,300 more acres that are open to leasing than any of the action alternatives. Alternative A also offers fewer protective lease stipulations than any of the action alternatives, with approximately 700,000 to 746,000 fewer lease acres stipulated with a No Surface Occupancy (NSO). It is important to note that while only standard lease stipulations apply to alternative A, these lease areas will meet all DLMP components during subsequent NEPA analysis affording these lands under Alternative A essentially the same protections found under alternatives B, C, and D. Under the "no new lease" scenario only the existing lease areas have potential for development under this alternative resulting in fewer acres of potential influence to the species. However, the extreme rarity of Allen's big-eared bat in Colorado suggests that measurable impacts to this species from fluid minerals activities are unlikely.

It is predicted in the Plan Revision that all alternatives will provide the same wildlife management actions in regards to mine closure gates for bats as opportunities arise. Thus, all alternatives install the same quantity and quality of mine closure bat gates over the life of the Plan. These closures are coordinated with the Colorado Division of Wildlife and the Department of Minerals and Geology and will provide undisturbed habitat for mine-associated bat species while also addressing human safety and health issues. Allen's big-eared bat could potentially benefit from such closures if they are ever located in Colorado. While other mine-associated bat species currently benefit from this program no benefits can yet be associated with Allen's big-eared bat.

In regards to activities that could potentially influence Allen's big-eared bat, Alternative B, C and D offer approximately 28,300 fewer acres of potential oil and gas lease area than the no action. The fewer amounts of available lease acres suggest that fewer potential impacts to mine, rock, or cliff dwelling bats might be associated with the action alternatives. Under the "no new lease" scenario only the existing lease areas have potential for development under these alternatives resulting in fewer acres of potential influence to the species. As with Alternative A, however, the extreme rarity of this species in Colorado suggests that measurable impacts are unlikely and would not differ from the no action.

There is no difference among the Plan revision alternatives in regards to implementation of wildlife management activities that may provide bat gates on abandoned mines used by bat species.  Although benefits to several bat species can be expected from these activities, no benefits to Allen's big-eared bat is expected because of its rarity.

***Cumulative Effects:***   The Reasonable Foreseeable Development (RFD) scenario for fluid minerals development predicts that 578 future well pads could be developed under Alternative A and, very similarly, 560, 555, and 570 well pads under alternatives B, C, and D, respectivly.  Most (530 to 553) of these would occur in the Paradox Basin area (conventional, 325 wellpads, and Gothic shales, 648 wellpads) with another 25 in the San Juan Sag.  Each well pad development could affect about 1.5 to 5 acres at well pads and other facilities, and involve linear openings along roads and utility corridors. Linear openings would be about 40 feet wide.  All trees and other vegetation in these areas would be removed at well pads.  In general, developments do not alter cliffs, rock rims, abandoned mines, and other steep sites that could potentially offer roost sites.

**Table S-BE-1. Well pads for existing leases within the cumulative effects area.**
***(New table added for Supplemental BE analysis)***

| | BLM & FS | State & Private | SUIT | Total |
|---|---|---|---|---|
| Existing | 152 | 352 | 2000 | 2504 |
| Projected | 727* | 1003 | 1300 | 3030 |
| Total | 879 | 1355 | 3300 | 5534 |

* Well pad numbers vary from 722 to 727 depending on the Alternative.

There have been approximately 2,504 CBM and conventional gas well pads drilled within the cumulative-effects area; 2,000 of those are within the boundaries of the Southern Ute Reservation (SUIT) and 352 are on State and private lands. CBM development within the grounds of the SUIT Reservation and on State and private lands are expected to increase in the near future. Statistics taken from the SUIT EIS (BLM et al. 2002) indicate that an additional 1,300 conventional gas, CBM methane, and injection well pads could be drilled within the bounds of the Reservation over the 25-year life of the project.  An additional 1003 well pads are projected on State and private lands.  Activities on these lands are not expected to measurably contribute to cumulative effects for this species because these lands generally lack the canyon lands and rimrock structure that occurs to the north along the Dolores River and Paradox Basin where the steep topography generally precludes surface development.

Fluid minerals activities that could potentially occur within the western boundaries of SJPL are not expected to have any measurable cumulative effects on Allen's big-eared bat because of the species rarity and the lack of potential impacts to the best potential habitat areas.  Wildlife management activities that implement bat gates at abandoned mine closures would also have no measurable cumulative effect for the same reasons.

While Alternatives A through D include both current and projected new leases, the "no new lease" scenario only includes current leases under each of the Alternatives.

**Determination:**  All Plan Revision alternatives are expected to have ***No Impact*** on Allen's big-eared bat or its primary habitat.  The rationale for this determination is as follows:

- Allen’s big-eared bat is considered a fringe population that is extremely rare in Colorado.
- No reproductive or roost sites for this species have been located in the state or on SJPL despite extensive work involving mine closures for other bat species.

## Big Free-tailed Bat (*BLM Sensitive*)

**Natural History and Background:** Big free-tailed bat (*Nyctinomops macrotis)* occurs from the southwestern United States to south-central Mexico (Adams 2003). In the Rocky Mountain States, it occurs from central Utah and Colorado southward throughout Arizona and New Mexico. Recent work by Navo and Gore (2001, cited in Adams 2003) reported the presence of individuals and roost sites in the western canyon country of Colorado, in particular along the Dolores River, Montrose County (Adams 2003).

The species has been reported on BLM lands near Dolores, Colorado where it has been detected using canyon habitat along the Dolores River (K. Nickell, pers. comm.). Roosting habitat is limited to snags given the absence of suitable cliffs.

This species prefers rocky landscapes, roosting high on cliff faces (Adams 2003). It also uses buildings for day roosts and occasionally roosts in tree cavities. Like most molossids, it leaves the roost long after dark, using fast powerful flight and emitting a loud, piercing chatter as it hunts for large moths (Adams 2003). Other prey includes crickets, flying ants, stinkbugs, and leafhoppers. In Colorado, few specimens have been collected, but these individuals were taken mostly in open country at moderate elevations (Armstrong et al. 1994). Maternity roosts have been documented in rock crevices, with long-term use of the crevice reported (Navo 2003). As with other bats human disturbance to roost sites appear to be an important limiting factor. Disturbance to maternity roosts from June through August may be limiting.

**Effects Analysis:** Plan Revision activities that could potentially influence the big free-tailed bat primarily involve fluid minerals development and possibly wildlife management (i.e. abandoned mine closures).

***Direct/Indirect Effects:*** The big free-tailed bat is currently known to occur sporadically on the far western portion of the SJPL. Its range could therefore overlap planned activities such as oil and gas development planned within the Paradox Basin. Differences in projected outputs for fluid minerals by alternative are displayed below in Table S-BE-2.

**Table S-BE-2: Activities and Projected Outputs that could Potentially Influence the Big Free-tailed bat, by Alternative**. *(previously published with DEIS; updated for Supplement)*

| ***Fluid Minerals Acreage Available & Stipulated*** | ***Alternative A*** | ***Alternative B*** | ***Alternative C*** | ***Alternative D*** |
|---|---|---|---|---|
| * Acres Not Available | 504, 622 | 535,645 | 535,645 | 535,645 |
| * Acres Open for Leasing | 2,136,779 | 2,108,476 | 2,108,476 | 2,108,476 |
| * No Surface Occupancy | 219,011 | 965,422 | 965,422 | 920,484 |
| * Controlled Surface Use | 294,515 | 183,058 | 183,058 | 195,642 |
| * Timing Limitations | 246,214 | 495,461 | 495,461 | 513,724 |
| * Standard Lease Terms | 1,377,039 | 488,591 | 488,591 | 502,938 |
| * New Wellpads Anticipated w/i the Paradox Basin (Gothic shale) | 406<br>(FS 291 and BLM 115) | 396<br>(FS 281 and BLM 115) | 391<br>(FS 276 and BLM 115) | 401<br>(FS 286 and BLM 115) |
| * New Wellpads Anticipated w/i the Paradox Basin (conventional) | 147 | 139 | 139 | 144 |
| ***Wildlife Management*** | | | | |
| * Install Structures to Maintain Bat Habitat on Mine Closures | As Opportunities Arise | same | same | same |

In regards to activities that could potentially influence the big free-tailed bat, Alternative A offers approximately 28,300 more acres open to leasing than any of the action alternatives. Alternative A also offers fewer protective lease stipulations than any of the action alternatives, with approximately 700,000 to 746,000 fewer lease acres stipulated with a No Surface Occupancy (NSO). It is noted, however, that while Alternative A will be leased with only the standard leasing stipulations, this alternative must comply with all DLMP components including standards, guidelines, and other referenced guidance. These plan components will be applied as conditions of approval in subsequent NEPA for development under this alternative. The protective leasing stipulations that apply to Alternatives B, C, and D were designed from DLMP components which provide essentially the same protections for the four alternatives. Under the “no new lease” scenario only the existing lease areas have potential for development under this alternative resulting in fewer acres of potential influence to the species.

Alternative A could theoretically offer a greater risk of impacting the big free-tailed bat because it is associated with greater development, and the species overlaps where fluid minerals development may occur. Because the big-free tailed bat primarily roosts in rock crevices in high, steep, cliff faces, however, it is unlikely that impacts to primary reproductive or roosting habitat would occur from oil and gas development. Although unlikely, minimal impacts to individuals cannot be completely discounted because the species will also occasionally roost in trees or snags which could be removed during development activities.

It is predicted in the Plan Revision that all alternatives will provide the same wildlife management actions in regards to mine closure gates for bats as opportunities arise. Thus, all alternatives install the same quantity and quality of mine closure bat gates over the life of the Plan. These closures are coordinated with the Colorado Division of Wildlife and the Department of Minerals and Geology and will provide undisturbed habitat for mine-associated bat species while also addressing human safety and health issues. The big free-tailed bat is primarily a cliff roosting species; however, individuals have occasionally clustered in roosts near the mouths of caves or mines so potential benefits cannot be completely discounted.

As displayed in Table S-BE-2, Alternative B, C and D offer fewer potential impacts from oil and gas development because they offer approximately 28,300 fewer acres of potential lease area. The action alternatives also offer greater protective lease stipulations, with approximately 746,000 more acres stipulated with a NSO in Alternatives B and C, and approximately 700,000 more acres in Alternative D. The fewer amounts of available lease acres and greater amount of protective lease stipulations suggest that fewer potential impacts to bats and/or important habitat structures may be associated with the action alternatives. Again, Alternative A will receive essentially the same protections as found in the leasing stipulations for the other alternatives as it must comply with DLMP components in subsequent NEPA analysis for development. Still, some potential impacts such as tree removals during development may still occur and influence habitat components. Under the “no new lease” scenario only the existing lease areas have potential for development under these alternatives resulting in fewer acres of potential influence to the species.

There is no difference among the Plan revision alternatives in regards to implementation of wildlife management activities that may provide bat gates on abandoned mines used by bat species. Although benefits to big free-tailed bats are questionable because it is not closely associated with mines or caves, it has been known to occasionally utilize these structures as roost sites. The same potential benefits are associated with each action alternative.

***Cumulative Effects:*** The Reasonable Foreseeable Development (RFD) scenario for fluid minerals development, by alternative, is displayed below in Table S-BE-3.

**Table S-BE-3: Reasonable Foreseeable Development scenario for oil and gas development on SJPL** *(Previously published with DEIS and updated for supplemental BE analysis)*

| Oil & Gas Well Pads Anticipated to be Drilled Over the Next 15 Years by Areas in the Reasonable Foreseeable Development Scenario (Currently Unleased Lands) | | | | |
|---|---|---|---|---|
| | Alt. A | Alt. B | Alt. C | Alt. D |
| * San Juan Basin | 0 | 0 | 0 | 0 |
| * Paradox Basin (conventional) | 147 | 139 | 139 | 144 |
| * Paradox Basin (Gothic shale) | 406 (FS 291 and BLM115) | 396 (FS 281 and BLM 115) | 391 (FS 276 and BLM 115) | 401 (FS286 and BLM 115) |
| * San Juan Sag | 25 | 25 | 25 | 25 |

As displayed in Table S-BE-3, the RFD predicts that 578 future well pads could be developed under Alternative A and, very similarly, 560, 555, and 570 well pads under alternatives B, C, and D, respectively. Most (530 to 553) of these would occur in the Paradox Basin area (conventional, 147 wellpads, and Gothic shales, 406 wellpads) with another 25 in the San Juan Sag. Each well pad development could affect about 1.5 to 5 acres at well pads and other facilities, and involve linear openings along roads and utility corridors. Linear openings would be about 40 feet wide. All trees and other vegetation in these areas would be removed at well pads. These developments are not expected to alter the high cliff areas utilized by big free-tailed bats for roosting; however, occasional removal of other potential habitat structures such as trees or snags may occur.

There have been approximately 2,504 CBM and conventional gas well pads drilled within the cumulative-effects area; 2,000 of those are within the boundaries of the Southern Ute Reservation (SUIT) and 352 are on State and private lands (Table S-BE-1). CBM development within the grounds of the SUIT Reservation and on State and private lands are expected to increase in the near future. Statistics taken from the SUIT EIS (BLM et al. 2002) indicate that an additional 1,300 conventional gas, CBM methane, and injection well pads could be drilled within the bounds of the Reservation over the 25-year life of the project. An additional 1003 well pads are projected on State and private lands. Activities on these lands are not expected to measurably contribute to cumulative effects for this species because these lands generally lack the canyon lands and rimrock structure that occurs to the north along the Delores River and Paradox Basin where the steep topography generally precludes surface development.

Fluid minerals activities that could potentially occur on the SJPL and overlap the known range of the big free-tailed bat are not expected to have any measurable cumulative effects on this species because primary habitat areas (i.e. high cliff faces) are unlikely to be impacted. Wildlife management activities that implement bat gates at abandoned mine closures could potentially have a minor positive cumulative effect because the species may occasionally use mines and caves as roost sites.

While Alternatives A through D include both current and projected new leases, the "no new lease" scenario only includes current leases under each of the Alternatives.

**Determination:** All Plan Revision alternatives, including Alternative A, "**may adversely impact individuals (big free-tailed bats), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide."** The rationale for this determination is as follows:

- The big free-tailed bat occurs but is uncommon on most San Juan Public Lands.
- Primary roost habitat is associated with steep canyon walls and high cliff structures that are unlikely to be impacted by Plan activities.
- All potential impacts cannot be completely discounted because oil and gas development activities may occasionally remove lesser-quality habitat structures such as trees or snags.

Minimal benefits are anticipated from wildlife management activities associated with bat gates during abandoned mine closures.

### Fringed Myotis *(BLM and FS Sensitive)*

**Natural History and Background:** The fringed myotis (*Myotis thysanodes pahasapensis)* ranges throughout western North America, from British Columbia southward into Mexico (Adams 2003). Records are scattered throughout the mountainous regions of the Rocky Mountain States. Colorado records are scattered at moderate elevations of 1,524-2,438 meters (5,000-8,000 feet) in mountainous parts of the state (Armstrong et al. 1994). The species has been found on the SJPL in an old/abandoned building on the Pagosa Ranger District. Additional known occurrences are from BLM lands near the Dolores River Canyon (K. Nickell, pers. com.).

In Colorado, the fringed myotis ranges across saxicoline brush and Douglas-fir forests on the eastern slope near Boulder (Adams et al. 1993) and in pinyon-juniper and ponderosa pine woodlands in other parts of the state (Armstrong et al. 1994). The diet of this species includes moths (Lepidoptera) and beetles (Coleoptera) that are taken close to the canopy. The species is also known to forage on bees (Hymenoptera) and lacewings (Trichoptera) (Adams 2003). Most foraging activity occurs between one and two hours after sunset, but some activity may continue until 4.5 hours after sunset. The species is particularly susceptible to human disturbances, especially near maternity colonies (O'Farrel and Studier 1980, cited in Adams 2003). Where available, caves, buildings, underground mines, rock crevices in cliff faces and bridges are used for maternity and night roosts, while hibernation has only been documented in building and underground mines (Bradley and Ports 2003). Tree roosting has also been documented in large conifer snags in Oregon, in ponderosa pine snags in New Mexico, and in hollow redwood and giant sequoia trees in California (Bradley and Ports 2003). The species is known to migrate, but to what extent is unclear.

The greatest threat to this bat is thought to be human disturbance of roost sites and especially maternity colonies, through recreational caving and mine exploration (Western Bat Working Group 1998, Arizona Game and Fish Department 1993). June through July is considered the most critical for disturbance. Other threats include closure of abandoned mines, renewed mining at historic sites, toxic material impoundments, pesticide spraying, vegetation conversion, livestock grazing, timber harvest, and destruction of buildings and bridges used as roosts (Western Bat Working Group 1998). It is also threatened by the disturbance or destruction of water sources and riparian habitat (NatureServe, 2007).

**Effects Analysis:** Plan Revision activities that could potentially influence the fringed myotis involve fluid minerals development, wildlife management (i.e. abandoned mine closures) and, possibly fuels treatment and timber management activities. Influences from fuels and timber treatments would be limited to the lower-elevation habitat types where the fringed myotis may potentially occur.

***Direct/Indirect Effects:*** The fringed myotis bat occurs sporadically over much of the western portion of the SJPL. Its range could therefore overlap planned activities such as oil and gas development in the Paradox Basin, timber management, and fuels management activities. Differences in outputs associated with these activities are displayed below in Table S-BE-4.

**Table S-BE-4: Activities and Projected Outputs that could Potentially Influence the Fringed Myotis Bat, by Alternative**. *(Previously published with DEIS and updated for supplemental BE analysis)*

| ***Fluid Minerals Acreage<br><br>Available & Stipulated*** | ***Alternative A*** | ***Alternative B*** | ***Alternative C*** | ***Alternative D*** |
|---|---|---|---|---|
| * Acres Not Available | 504, 622 | 535,645 | 535,645 | 535,645 |
| * Acres Open for Leasing | 2,136,779 | 2,108,476 | 2,108,476 | 2,108,476 |
| * No Surface Occupancy | 219,011 | 965,422 | 965,422 | 920,484 |
| * Controlled Surface Use | 294,515 | 183,058 | 183,058 | 195,642 |
| * Timing Limitations | 246,214 | 495,461 | 495,461 | 513,724 |
| * Standard Lease Terms | 1,377,039 | 488,591 | 488,591 | 502,938 |
| * New Well Pads Anticipated w/i the Paradox Basin (conventional) | 147 | 139 | 139 | 144 |
| * New Well Pads Anticipated w/i the Paradox Basin (Gothic shale) | 406<br>(FS 291 and BLM 115) | 396<br>(FS 281 and BLM 115) | 391<br>(FS 276 and BLM 115) | 401<br>(FS 286 and BLM115) |
| ***Wildlife Management*** | | | | |
| * Install Structures to Maintain Bat Habitat on Mine | As Opportunities | same | same | same |

| | | | | |
|---|---|---|---|---|
| Closures | Arise | | | |
| ***Timber Treatment Acres (Suitable Habitat Only)*** | | | | |
| * Ponderosa Pine | 1,000 Restoration<br>500 ac. Partial Cut | 1,000 Restoration<br>500 ac. Partial Cut | 900 Restoration<br>400 ac Partial Cut | 1500 Restoration<br>500 ac Partial cut |
| * Warm Dry Mix-Con | 250 Restoration<br>250 Partial Cut | 250 Restoration<br>250 Partial Cut | 200 Restoration<br>225 Partial Cut | 200 Restoration<br>225 Partial Cut |
| Fuels Treatment Acres (Suitable Cover Types Only) | | | | |
| * Pinyon/Juniper | 1000 Mastication | 1000 Mastication | 1000 Mastication | 1100 Mastication |
| * Mixed Shrubland | 1500 Mastication | 1500 Mastication | 1500 Mastication | 1600 Mastication |
| * Ponderosa Pine | 4000 Prescribed Fire | 4000 Prescribed Fire | 4000 Prescribed Fire | 4000 Prescribed Fire |

As noted for other bat species, Alternative A offers approximately 28,300 more acres open to leasing than any of the action alternatives. Alternative A also offers fewer protective lease stipulations at the leasing stage than any of the action alternatives, with approximately 700,000 to 746,000 fewer lease acres stipulated with a No Surface Occupancy (NSO). It is noted, however, that while Alternative A will be leased with only the standard leasing stipulations, this alternative must comply with all DLMP components including standards, guidelines, and other referenced guidance. These plan components will be applies as conditions of approval in subsequent NEPA for development under this alternative. The protective leasing stipulations that apply to Alternatives B, C, and D were designed from DLMP components which provide essentially the same protections for the four alternatives. Under the “no new lease” scenario only the existing lease areas have potential for development under this alternative resulting in fewer acres of potential influence to the species.

Alternative A offers similar timber management treatments as Alternative B and C in dry forest types that may support fringed myotis. Because the fringed myotis is known to day roost in both ponderosa pine and large pinyon-juniper snags, potential impacts to the species could occur if the planned activities result in reductions in these components. This potential affect would be similar across most alternatives. Conversely, restoration activities that include thinning of small dense trees might benefit the foraging patterns of many bat species. Several Plan components also focus on snag management and retention, and although impacts will occur they are anticipated to be minor.

Alternative A offers similar fuels treatments as the other alternatives in the dry forest types that offer potential habitat for the fringed myotis. Mastication of small underbrush should not have measurable influences on the primary habitat components for this species. However, the fringed myotis also roosts in pinyon-juniper cover types that are also targeted for fuels reduction. Impacts to potential roost sites or individual bats could occur in these locations if large trees and snags are removed. Prescribed fire activity projections are also similar across all alternatives, and vary by only 100 to 200 acres. As with mastication, prescribed fire could negatively influence potential roost structures if snags are fire-hardened, removed, or burned.

Alternative A provides the same wildlife management actions in regards to mine closures with bat gates as opportunities arise. Thus, all alternatives install the same quantity and quality of mine closure bat gates over the life of the Plan. This action could be quite beneficial to the fringed myotis because it readily roosts in abandoned mines.

In general, Alternative A offers a slightly higher risk of negative influences on some potential habitat components for the fringed myotis, such as snags, because it allocates a greater amount of area to active management scenarios. However, potential impacts are expected to be minimal because abandoned mines and cave habitat represent one of the most significant landscape features for this species and all alternatives include active wildlife management goals that target important underground roost sites for closure and protection. Plan Components are also expected to reduce impacts to snags and other vegetation where active management occurs.

As displayed in Table S-BE-4, the action alternatives offer fewer potential impacts from oil and gas development because they offer approximately 28,300 fewer acres of potential lease area. The fewer amounts of available lease acres suggest that fewer potential impacts to bats and/or important habitat structures may be associated with the action alternatives. As with other bat species, however, some potential impacts such as tree removals may occur during development of oil and gas wells or facilities. Tree removal could be more impacting to the fringed myotis because it frequently day roosts in ponderosa pine and/or pinyon-juniper vegetation. Under the "no new lease" scenario only the existing lease areas have potential for development under these alternatives resulting in fewer acres of potential influence to the species.

The protection of abandoned mines with bat gates could be the single-most important Plan output in regards to conservation of the fringed myotis because it frequently utilizes mines and caves for reproductive habitat. The fringed myotis is also very sensitive to disturbances within these habitats. There is no difference among the Plan revision alternatives in regards to implementation of wildlife management activities that may provide bat gates on abandoned mines used by bat species. The same potential benefits are associated with each action alternative.

***Cumulative Effects:*** In regards to fluid minerals development, the cumulative effects analysis for the big free-tailed bat is expected to accurately portray the Reasonable Future Development (RFD) scenario as associated with potential cumulative effects on the fringed myotis. See Table S-BE-3 for this information.

In regards to past, current or reasonably foreseeable vegetative changes that may have influenced the fringed myotis, its primary habitat types have most likely been greatly altered from historic conditions. For example, evidence suggests that low-elevation ponderosa pine forest in southwestern Colorado occurred as uneven-aged stands with clumps of even-aged trees scattered throughout. These forests varied in density and age class distribution across the landscape and low-intensity fires were common. Historic reports suggest that large and very large ponderosa pine trees were present that would have offered ample snag habitat for bat species that utilize these components as roost sites. Fire suppression and timber harvest activities have resulted in significant structural changes in ponderosa pine forests as compared to historic conditions, particularly on private lands. It is therefore likely that potential snag roosts have also been reduced.

Although less evident, pinyon-juniper forests have also undergone changes from historic conditions due to heavy use by livestock, significant harvesting, and a decrease in wildfire frequency. In combination, these factors have allowed pinyon-juniper to establish and dominate new communities and expand to higher and lower elevations, with denser stands and higher canopies (Tausch 1999). Pinyon-juniper woodlands that were once dominated by large trees with openings composed of younger trees and grasses, forbs, and shrubs are now denser, with a corresponding loss of openings. Current evidence suggests that existing pinyon-juniper stands have more dense woodland and less open savanna then occurred historically. The large tree component in many pinyon-juniper stands has also been reduced from firewood gathering, fires, insect agents, and other factors. As with ponderosa pine, much of the older pinyon-juniper has been greatly reduced on private lands, thereby suggesting that potential snag habitat for bats has also been reduced.

Although some management trends on private lands have recently changed, it is likely that the majority of mature stands and habitat values for bats and other wildlife species will remain and occur primarily on public lands. The focus of these lands under all alternatives involves restoration activities such as thinning, fuel reductions, and prescribed fire intended to help return these cover types to a more historic condition. This focus should help buffer the negative cumulative impacts that have occurred on private lands, and maintain habitat conditions on public lands that are more resilient to large-scale fires and other major landscape changes.

While Alternatives A through D include both current and projected new leases, the "no new lease" scenario only includes current leases under each of the Alternatives.

**Determination:** All Plan Revision alternatives, including Alternative A, "**may adversely impact individuals (fringed myotis), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide."** The rationale for this determination is as follows:

- The fringed myotis bat is an uncommon species on San Juan Public Lands that may overlap some Plan activities in lower elevation vegetation types.
- The single-most important habitat element for the fringed myotis on SJPL is most likely suitable mines and caves that provide reproductive habitat. Protection of these features is similarly associated with all alternatives.
- All potential impacts cannot be completely discounted because some Plan activities may occasionally remove potential snag and tree roosts utilized by the species.
- More information on use of pinyon-juniper habitat by this and other species is recommended because of fuels reduction activities that target this vegetation type.

### Gunnison's Prairie Dog *(FS sensitive)*

**Natural History and Background:** Gunnison's prairie dogs (*Cynomys gunnisoni)* are distributed from Central Colorado to central Arizona, including southeastern Utah and much of the northwestern half of New Mexico (NatureServe, 2005). In Colorado, the species is restricted to southwestern and south-central Colorado. They range in elevation from 6,000 to 12,000 feet. They are well distributed across SJPL at lower elevations.

Gunnison's prairie dogs inhabit grasslands and semidesert and montane shrublands (Fitzgerald et al. 1994). Habitat use by Gunnison's prairie dogs differs somewhat from the black-tailed prairie dog primarily due to the strikingly different geographical settings within the range distribution of these species. The black-tailed prairie dog is primarily a prairie species, while the Gunnison's prairie dog is associated with intermountain valleys, benches, and plateaus that offer prairie-like topography and vegetation. These intermountain valleys, benches, and plateaus can range from very arid to mesic sites. Gunnison prairie dogs can occupy mesic plateaus and higher mountain valleys, as well as arid lowlands (Knowles, 2002). The species is generally found in groups of several individuals, and often times forming colonies. They dig burrows that are used for raising young, and provide cover from predators.

The species feeds on grasses, forbs, sedges, and shrubs. Insects are of minor importance to its diet. Flowers and other succulent parts of forbs and shrubs are also consumed but the animals do little digging for roots and tubers (Fitzgerald et al. 1994). The species is not known to store food in its burrow. As with all species of prairie dogs and most ground squirrels, they gather grasses and forbs for nesting materials, especially in late summer. Free water is not required (Fitzgerald et al. 1994).

Gunnison's prairie dogs hibernate. In central Colorado around 10,000 feet, individuals entered burrows by October and emerged in mid-April. Hibernation periods at lower elevations are shorter and some individuals may even appear above ground in winter months (Raynor et al. 1987, cited in Fitzgerald et al. 1994).

Predators include badgers, golden eagles, coyotes, bobcats, and red-tailed hawks. Plague and poisoning have caused considerable retraction of the species in parts of Colorado and New Mexico (Fitzgerald et al. 1994). In Colorado, prairie dogs are considered small game species and are provided no protection from harvest. Reproduction occurs May through mid July.

**Effects Analysis:** Plan Revision activities that could potentially influence the Gunnison prairie dog primarily involve fluid minerals development, road construction/reconstruction, summer motorized recreation, and range management activities (i.e. livestock grazing and associated activities).

> ***Direct/Indirect Effects:*** The Gunnison prairie dog occurs sporadically over the western portion of the SJPL on both BLM and National Forest Systems land. Its range could therefore overlap planned activities such as oil and gas development, motorized recreation, and possible road construction/reconstruction. Prairie dog colonies also overlap areas utilized by cattle grazing. Differences in outputs associated with these activities are displayed below in Table S-BE-5.

**Table S-BE-5: Activities and Projected Outputs that could Potentially Influence the Gunnison Prairie Dog, by Alternative**. *(Previously published with DEIS and updated for supplemental BE analysis)*

| ***Fluid Minerals Acreage*** <br> ***Available & Stipulated*** | ***Alternative A*** | ***Alternative B*** | ***Alternative C*** | ***Alternative D*** |
|---|---|---|---|---|
| * Acres Not Available | 504, 622 | 535,645 | 535,645 | 535,645 |
| * Acres Open for Leasing | 2,136,779 | 2,108,476 | 2,108,476 | 2,108,476 |
| * No Surface Occupancy | 219,011 | 965,422 | 965,422 | 920,484 |
| * Controlled Surface Use | 294,515 | 183,058 | 183,058 | 195,642 |
| * Timing Limitations | 246,214 | 495,461 | 495,461 | 513,724 |
| * Standard Lease Terms | 1,377,039 | 488,591 | 488,591 | 502,938 |
| * New Rd Construction/ Fluid Minerals (miles) | 295 | 282 | 282 | 290 |
| * New Rd Construction/ Fluid Minerals (miles) <br> Gothic Shale (unleased) | 202 <br> (145 FS and 57 BLM) | 200 <br> (143 FS and 57 BLM) | 195 <br> (138 FS and 57 BLM) | 200 <br> (143 FS and 57 BLM) |
| ***Wildlife Management*** | | | | |
| * Install Structures to Maintain Bat Habitat on Mine Closures | As Opportunities Arise | same | same | same |
| * Livestock Grazing (Cattle AUMs | | | | |

| | | | | |
|---|---|---|---|---|
| Only) | | | | |
| * Premitted AUMs (FS) | 115,312 | 115,312 | 112,554 | 117,791 |
| Motorized recreation (Acres, Summer Travel) | | | | |
| * Roaded natural | 957,909 ac. | 647,407ac. | 569,731 ac. | 699,274 ac. |
| * Semi-primitive motorized | 414,152 ac. | 746,407ac. | 595,821 ac. | 779,219 ac. |
| * Semi-primitive non- motorized | 433,277 ac. | 433,520 ac. | 133,994 ac. | 351,735 ac. |
| * Primitive | 486,844 ac. | same as winter | 530,861 ac. | 0 ac. |
| * Primitive Wilderness | 0 ac. | same as winter | same as winter | same as winter |

The primary activities that have influenced Gunnison prairie dogs in Colorado involve intentional poisoning and plague (Fitzgerald et al. 1994). Recreational shooting may also influence local prairie dog populations in some locations. Outbreaks of plague are density-dependent occurrences that are not influenced by any of the Plan Revision alternatives, and poisoning is not permitted without additional analysis. Recreational shooting of prairie dogs is controlled and managed by the Colorado Division of Wildlife and not influenced by the plan alternatives.

The exact locations of fluid minerals development are not known at this time. However, potential development areas do overlap the range of the Gunnison prairie dog, so some influences or impacts could be possible. Although the number of projected well developments is similar under all alternatives, Alternative A offers more acres open to leasing than any of the action alternatives. Alternative A also offers fewer protective lease stipulations at the leasing stage than any of the action alternatives. It is noted, however, that while Alternative A will be leased with only the standard leasing stipulations, this alternative must comply with all DLMP components including standards, guidelines, and other referenced guidance. These plan components will be applied as conditions of approval in subsequent NEPA for development under this alternative. The protective leasing stipulations that apply to Alternatives B, C, and D were designed from DLMP components which provide essentially the same protections for the four alternatives All alternatives also offer approximately 290 miles of new road construction (with less than 12 miles difference between alternatives, Table S-BE-5.) to access new lease sites. It is possible that potential impacts from this activity could occur to existing prairie dog colonies through loss of habitat or development on occupied sites. Under the “no new lease” scenario only the existing lease areas have potential for development under this alternative resulting in fewer acres of potential influence to the species.

It is likely that winter travel is not a major influence on prairie dogs because the species hibernates while that activity is occurring. In regards to summer motorized travel, Alternative A offers more suitable acres for this activity than in any of the action alternatives. Although summer travel probably causes no direct impacts to prairie dog colonies, motorized travel near the colonies may disturb the species or disrupt their foraging habits.

Alternative A continues the current range management practices under the current respective management plans for both the Forest Service and BLM. Cattle grazing on Forest Service lands are continued at 115,312 AUMs on approximately 655,000 acres. Cattle grazing influences on Gunnison prairie dog are expected to be neutral or perhaps positive because of influences on vegetation growth and composition.

In summary, some impacts to existing prairie dog colonies could be associated with the no action alternative. However, the primary influences on prairie dog persistence are not expected to be associated with any activities authorized under the Plan Revision.

As with Alternative A, the action alternatives will have no influence over the control of plague outbreaks and no additional authority over state actions involving recreational shooting. Poisoning of prairie dogs is not allowed under any alternative without additional analysis.

As displayed in Table S-BE-5, the action alternatives may offer fewer potential impacts from oil and gas development because they offer fewer acres of potential lease area. There are no lease stipulations specific to the Gunnison prairie dog in any alternative. However, there are energy corridor stipulations that pertain to this species to help meet conservation goals when prairie dog colonies are encountered. The leasing stipulations and plan components offer protection which could provide less disturbance to the species for the alternatives. Under the “no new lease” scenario only the existing lease areas have potential for development under these alternatives resulting in fewer acres of potential influence to the species.

The action alternatives offer fewer suitable acres for summer motorized travel. Consistent with the theme of minimizing human influences, Alternative C is the most restrictive. All action alternatives provide potential benefits because of greater controls on off-road travel. Greater indirect benefits to prairie dogs may therefore be associated with the action alternatives.

Changes in permitted livestock in the action alternatives are not expected to have much influence on Gunnison prairie dog because of generally neutral interactions between the two. However, if cattle are providing indirect benefits to prairie dogs because of grazing influences this might be reduced in Alternative C. Overall, however, no detectable differences are expected.

In summary, some potential impacts associated with oil and gas development and motorized travel could be reduced in the action alternatives. Overall, however, the primary influences on prairie dog persistence are not expected to differ under the action alternatives.

***Cumulative Effects:*** Gunnison prairie dog colonies have been greatly reduced from historic numbers because of influences such as intentional poisoning and introduced plague. Recreational shooting has probably impacted localized populations in some area. Intentional poisoning has been greatly reduced over time but still may continue on private lands. On public lands, however, this activity is strictly controlled. Plague outbreaks remain a primary factor influencing Gunnison prairie dogs in Colorado.

Some planned activities on the SJPL may influence existing prairie dog colonies. While Alternatives A through D include both current and projected new leases, the “no new lease” scenario only includes current leases under each of the Alternatives. Overall, however, the SJPL remain a refuge for the prairie dog and planned activities are expected to have little influence on their persistence. Planned activities are not expected to contribute to any negative cumulative effects on the species habitat or populations.

**Determination:** All Plan Revision alternatives, including Alternative A, "**may adversely impact individuals (Gunnison prairie dogs), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide."** The rationale for this determination is as follows:

- Plague and other influences outside the control of the SJPL are the primary influences on Gunnison prairie dogs.
- Some Plan activities may overlap existing colonies.
- All potential impacts cannot be completely discounted because some Plan activities may have minor influences on the colonies.

### Spotted Bat *(BLM and FS sensitive)*

**Natural History and Background:** The spotted bat (*Euderma maculatum)* occurs from south central British Columbia to southern Mexico. In Colorado, spotted bats occur in the western semidesert canyonlands (Armstrong et al. 1994). There is no information available on population trends for spotted bats at the Region, State, or Unit level (USDA Forest Service 2004f). They are generally found in such low abundances that reliable detection is problematic, much less the accurate estimates of trends. Spotted bats have been found on BLM lands near the Dolores River Canyon (K. Nickell, pers. com.).

The spotted bat is a desert specialist most often occupying rough, rocky, semiarid terrain (Adams 2003). It is often captured in open ponderosa pine woodlands (Adams 2003). Rocky cliffs are necessary to provide suitable cracks and crevices for roosting, as is access to water (Fitzgerald et al. 1994). The species roosts by day in rock crevices located on high cliffs (Watkins 1997, cited in Adams 2003). Specific characteristics of the roost are not known, however (Western Bat Working Group 1998). The dependency of rock-faced cliff roosting habitat limits the spotted bat to very small geographic areas with specific geologic features (Luce 2003). Foraging begins about one hour after dark and ends just before sunrise, and this species tends to forage 10-15 meters (33-50 feet) above the ground at or above treetops. Foraging has been observed in forest openings, pinyon-juniper woodlands, large riverine/riparian habitats, riparian habitat associated with small to mid-sized streams in narrow canyons, wetlands, meadows, and agricultural fields (Western Bat Working Group 1998). Its diet appears to consist of moths, but grasshoppers, beetles, katydids, and perhaps smaller insects may be taken (Fitzgerald et al. 1994).

The wintering habits of the spotted bat in the northern part of its range are not well understood. Specimens taken in September and October may indicate post-breeding wandering but could be elevational movement towards winter range (Luce 2003). Very little is known of reproductive patterns in this bat. Judging from lactation records, young are born from mid-June until early July in Arizona (Hoffmeister 1986, cited in Adams 2003).

Historically, the spotted bat has endured little impact from human disturbance because its roosts are remote, but creation and subsequent flooding of reservoirs may eliminate suitable roosting habitat. Recreational rock climbing also may disturb bats in local situations (Luce 2003). Large-scale pesticide programs to control Mormon crickets and grasshoppers could affect this species by reducing the availability of prey (Luce 2003). Loss of foraging habitats because of activities such as livestock grazing may also affect this bat (Fitzgerald et al. 1994). Disturbance to hibernacula in the winter months during temperature extremes could be limiting.

**Effects Analysis:** Plan Revision activities that could potentially influence the spotted bat primarily involve fluid minerals development and, possibly, range management activities (i.e., water developments). Non-motorized recreation (i.e. rock climbing) could theoretically influence the species if climbing activities happened to disturb roosting individuals within rock crevices. However, there is no information that rock climbing is a risk to the species and assessing that activity would be purely speculative at this time.

***Direct/Indirect Effects:*** The spotted bat is a desert species that is currently known to occur sporadically on the far western portion of the SJPL. Its range could therefore overlap planned activities such as oil and gas development in the Paradox Basin. This overlap would primarily involve activities planned within the Paradox Basin. Differences in projected outputs for fluid minerals by alternative are displayed below in Table S-BE-6.

**Table S-BE-6: Activities and Projected Outputs that could Potentially Influence the Spotted Bat by Alternative**. *(Previously published with DEIS and updated for supplemental BE analysis)*

| *Fluid Minerals Acreage Available & Stipulated* | *Alternative A* | *Alternative B* | *Alternative C* | *Alternative D* |
|---|---|---|---|---|
| * Acres Not Available | 504, 622 | 535,645 | 535,645 | 535,645 |
| * Acres Open for Leasing | 2,136,779 | 2,108,476 | 2,108,476 | 2,108,476 |
| * No Surface Occupancy | 219,011 | 965,422 | 965,422 | 920,484 |
| * Controlled Surface Use | 294,515 | 183,058 | 183,058 | 195,642 |
| * Timing Limitations | 246,214 | 495,461 | 495,461 | 513,724 |
| * Standard Lease Terms | 1,377,039 | 488,591 | 488,591 | 502,938 |
| * Total new Rd Construction/ Fluid Minerals (miles) | 295 | 282 | 282 | 290 |
| * New Rd Construction/ Fluid Minerals (miles)<br>Gothic Shale (unleased) | 202<br>(145 FS and 57 BLM) | 200<br>(143 FS and 57 BLM) | 195<br>(138 FS and 57 BLM) | 200<br>(143 FS and 57 BLM) |
| * New Well Pads Anticiapted w/i the | 147 | 139 | 139 | 144 |

| | | | | |
|---|---|---|---|---|
| Paradox Basin (conventional) | | | | |
| * New Well Pads Anticiapted w/i the Paradox Basin (Gothic shale) | 406<br>(FS 291 and BLM 115) | 396<br>(FS 281 and BLM 115) | 391<br>(FS 276 and BLM 115) | 401<br>(FS 286 and BLM115) |
| * Livestock Grazing (Cattle AUMs Only) | | | | |
| * Premitted AUMs (FS) | 115,312 | 115,312 | 112,554 | 117,791 |

In regard to activities that could potentially influence the spotted bat, there is little difference between alternatives in regard to the projected amount of new well pad developments within the Paradox Basin. Alternative A offers fewer protective lease stipulations than any of the action alternatives at the leasing stage. It is noted, however, that while Alternative A will be leased with only the standard leasing stipulations, this alternative must comply with all DLMP components including standards, guidelines, and other referenced guidance. These plan components will be applies as conditions of approval in subsequent NEPA for development under this alternative. The protective leasing stipulations that apply to Alternatives B, C, and D were designed from DLMP components which provide essentially the same protections for the four action alternatives. Under the "no new lease" scenario only the existing lease areas have potential for development under this alternative resulting in fewer acres of potential influence to the species.

As with other cliff/rock associated bat species, Alternative A could theoretically offer a greater risk of impact because it is associated with greater development. Because the spotted bat primarily roosts in rock crevices in high cliff faces, it is unlikely that impacts to primary reproductive or roosting habitat would occur. If overlaps did occur, however, there may be a greater risk of impact to this species because it appears to reuse traditional rock crevice roost sites regularly (Wai-Ping and Fenton 1989). Use of tress and other vegetation as roost sites appears to be avoided by spotted bats. The species also does not appear to utilize mines or caves.

Benefits to this species could occur from water pond developments associated with livestock grazing. This activity has the potential to create valuable drinking water sites important to many bat species. Potential benefits are expected to be similar in all alternatives.

As displayed in Table S-BE-6, Alternative B, C and D offer fewer potential impacts from oil and gas development because, although the number of well pads does not decrease appreciably, they offer fewer acres of potential lease area across SJPL. Because of this species rarity, however, all potential impacts are expected to be minimal. Under the "no new lease" scenario only the existing lease areas have potential for development under these alternatives resulting in fewer acres of potential influence to the species.

***Cumulative Effects:*** The Reasonable Foreseeable Development (RFD) scenario for fluid minerals development across SJPL, by alternative, is displayed in Table S-BE-3. The reader is referred to that table as potential cumulative effects on the spotted bat are expected to be similar as those described for the big free-tailed bat. While Alternatives A through D include both current and projected new leases, the "no new lease" scenario only includes current leases under each of the Alternatives.

**Determination:** All Plan Revision alternatives, including Alternative A, "**may adversely impact individuals (spotted bat), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide."** The rationale for this determination is as follows:

- The spotted bat is an uncommon to rare species on San Juan Public Lands that may overlap some Plan activities in lower elevation vegetation types.
- Most potential impacts on this species are probably unlikely because of its roosting behavior. However, all potential impacts cannot be completely discounted because roost sites are not known and some Plan activities could disturb rocky areas.
- More information on use of pinyon-juniper habitat by this and other species is recommended because of fuels reduction activities that target this vegetation type.

### Yuma Myotis *(BLM sensitive)*

**Natural History and Background:** The Yuma myotis (*Myotis yumanensis)* occurs from southwestern British Columbia through the western United States and into central Mexico. In the Rocky Mountain region, it lives throughout Arizona and New Mexico, in south-central Colorado in a southwest-north-central band across Utah, as well as in parts of western and central Montana and across much of Idaho (Adams 2003).

The species has been reported on BLM lands near Dolores, Colorado where it has been detected using canyon habitat along the Dolores River (K. Nickell, pers. comm.). Roosting habitat is limited to bridges, buildings, and snags given the absence of cliffs, caves, and mines on BLM lands.

Yuma myotis, no matter the habitat, occur where there is open water, and often in areas that are treeless (Adams 2003). The species diet includes beetles and soft-bodied insects such as flies, termites, moths, and mayflies. Foraging occurs over the surface of streams and ponds. In Colorado, the Yuma myotis occurs in riparian woodlands, semidesert shrub, and pinyon-juniper woodlands (Armstrong et al. 1994). The species roosts in bridges, building, cliff crevices, caves, mines, and trees (Bogan et al. 2003).

Maternity colonies are formed in buildings, caves, and mines, and under bridges, sometimes in abandoned cliff-swallow nests, and are abandoned quickly if disturbed (Adams 2003). A single young is born in late May to July (Fitzgerald et al. 1994). Winter habitats are poorly documented, but the animals may hibernate near their summer range (Fitzgerald et al. 1994).

As with many other bat species, human disturbance to roost sites appear to be an important limiting factor. Disturbance to maternity roosts from May through July may be limiting.

**Effects Analysis:** Plan Revision activities that could potentially influence the Yuma myotis bat primarily involve fluid minerals development, wildlife management (i.e. abandoned mine closures), range management (i.e. livestock grazing, water developments) and, possibly fuels treatment activities.

***Direct/Indirect Effects:*** The yuma myotis bat occurs sporadically over much of the western portion of the SJPL. Its range could therefore overlap planned activities such as oil and gas development within the Paradox Basin and possibly fuels management activities. Water developments associated with livestock grazing may also be beneficial to the species. Differences in outputs associated with these activities are displayed below in Table S-BE-7.

**Table S-BE-7: Activities and Projected Outputs that could Potentially Influence the Yuma Myotis Bat, by Alternative**.

| ***Fluid Minerals Acreage***<br><br>***Available & Stipulated*** | ***Alternative A*** | ***Alternative B*** | ***Alternative C*** | ***Alternative D*** |
|---|---|---|---|---|
| * Acres Not Available | 504, 622 | 535,645 | 535,645 | 535,645 |
| * Acres Open for Leasing | 2,136,779 | 2,108,476 | 2,108,476 | 2,108,476 |
| * No Surface Occupancy | 219,011 | 965,422 | 965,422 | 920,484 |
| * Controlled Surface Use | 294,515 | 183,058 | 183,058 | 195,642 |
| * Timing Limitations | 246,214 | 495,461 | 495,461 | 513,724 |
| * Standard Lease Terms | 1,377,039 | 488,591 | 488,591 | 502,938 |
| * New Well Pads Anticiapted w/i the Paradox Basin (conventional) | 147 | 139 | 139 | 144 |
| * New Well Pads Anticiapted w/i the Paradox Basin (Gothic shale) | 406<br>(FS 291 and BLM 115) | 396<br>(FS 281 and BLM 115) | 391<br>(FS 276 and BLM 115) | 401<br>(FS 286 and BLM115) |
| ***Wildlife Management*** | | | | |
| * Install Structures to Maintain Bat Habitat on Mine Closures | As Opportunities Arise | same | same | same |
| Fuels Treatment Acres (Suitable Cover Types Only) | | | | |

| | | | | |
|---|---|---|---|---|
| * Pinyon/Juniper | 1000 Mastication | 1000 Mastication | 1000 Mastication | 1100 Mastication |
| Livestock Grazing (Cattle AUMs Only) | | | | |
| * Premitted AUMs (BLM) | 22,101 | 22,100 | 16,530 | 22,290 |

As noted for other bat species, Alternative A offers more acres available to leasing across SJPL than any of the action alternatives. Alternative A offers fewer protective lease stipulations than any of the action alternatives at the leasing stage. It is noted, however, that while Alternative A will be leased with only the standard leasing stipulations, this alternative must comply with all DLMP components including standards, guidelines, and other referenced guidance. These plan components will be applies as conditions of approval in subsequent NEPA for development under this alternative. The protective leasing stipulations that apply to Alternatives B, C, and D were designed from DLMP components which provide essentially the same protections for the four alternatives. The development of more well pads are projected under Alternative A and a greater likelihood of impacts may therefore be associated with no action. Under the "no new lease" scenario only the existing lease areas have potential for development under this alternative resulting in fewer acres of potential influence to the species.

Alternative A offers similar fuels treatments as the other alternatives in the pinyon-juniper forest types that are most often utilized by the yuma myotis. However, the yuma myotis uncommonly uses trees and snags for day roosts, and mastication of small underbrush sis not expected to have any measurable influences on the primary habitat components for this species.

Alternative A provides the same wildlife management actions in regards to mine closures with bat gates as opportunities arise. Thus, all alternatives install the same quantity and quality of mine closure bat gates over the life of the Plan. As with over cave-dwelling bat species, this action could be quite beneficial to the yuma myotis because it readily roosts in abandoned mines. Alternative A also retains livestock grazing areas that may contribute to drinking areas through pond developments.

In general, Alternative A offers a slightly higher risk of negative influences on some potential habitat components for the yuma myotis because it allocates a greater amount of area to active management. However, potential impacts are expected to be minimal because abandoned mines and cave habitat represent one of the most significant landscape features for this species and all alternatives include active wildlife management goals that target important underground roost sites for closure and protection. Plan Components are also expected to reduce impacts to snags and other vegetation where active management occurs.

As displayed in Table S-BE-7, the action alternatives offer fewer potential impacts from oil and gas development because they offer fewer acres of potential lease area across SJPL. The fewer amounts of available lease acres suggest that fewer potential impacts to bats and/or important habitat structures may be associated with the action alternatives. Under the "no new lease" scenario only the existing lease areas have potential for development under these alternatives resulting in fewer acres of potential influence to the species. As with other bat species, however, some potential impacts such as tree removals may occur during development of oil and gas wells or facilities. Tree removal may affect individual yuma myotis bats, but is not expected to be a major impact to the species because of its affinities for rocks and caves.

The protection of abandoned mines with bat gates could be the single-most important Plan output in regards to conservation of the yuma myotis because it frequently utilizes mines and caves for reproductive habitat. There is no difference among the Plan revision alternatives in regards to implementation of wildlife management activities that may provide bat gates on abandoned mines used by bat species. The same potential benefits are associated with each action alternative.

The action alternatives vary in the amount of livestock AUMs permitted, with no change in Alternative B, a slight increase in Alternative D, and a decrease in Alternative C. It is assumed that all alternatives offer similar potential for water developments within the range of the yuma myotis.

***Cumulative Effects:*** In regards to activities that could potentially influence the yuma myotis, the cumulative effects analysis for the big free-tailed bat and the fringed myotis most accurately portray this information. Please refer to these species for this information. The overall cumulative effects to this species are expected to be minimal because it is not as strongly associated with dry forest vegetation for roost sites. Cave and abandoned mine management are expected to be the most significant management activities for the conservation of this species.

**Determination:** All Plan Revision alternatives, including Alternative A, "**may adversely impact individuals (yuma myotis bats), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide."** The rationale for this determination is as follows:

- The yuma myotis is most commonly associated with semi-desert shubland and rock canyon areas that are not subject to intensive management.
- The yuma myotis has a weak affinity for pinyon-juniper vegetation for day roosts, but may occasionally utilize snag habitat within these forest types.
- Cave management may be the most important factor in regards to conservation of this species.

## Birds

### Gunnison Sage-grouse *(BLM sensitive)*

**Natural History and Background:** The sage-grouse is the largest species of grouse in Norh America. Sage-grouse were believed to be a single species until the Greater and Gunnison (*Centrocercus minimus)* were identified as distinct species in 2000. Life histories and habitat requirements of the two species are similar. Gunnison sage-grouse is thought to have historically occurred in southwestern Colorado, northwestern New Mexico, northeastern Arizona, and southeastern Utah. Currently this species occur in what has been considered 8 widely scattered and isolated populations in Colorado and Utah. Two populations range over portions of BLM lands on SJPL (Dove Creek and San Miguel Basin populations). The Dove Creek population shares some genetics traits with the Monticello population in southeastern Utah and are considered 2 subpopulations of a single population. There are 6 subpopulations within the San Miguel Basin population: Dry Creek Basin, Hamilton Mesa, Miramonte Reservoir, Gurley Reservoir, Beaver Mesa, and Iron Springs. Land ownership patterns and involved Federal, State and local Agency responsibilities within these areas are quite diverse and complex and require careful planning by all parties under the Gunnison Sage-grouse Rangewide Conservation Plan (2004). The Colorado Division of Wildlife conducts annual lek counts on the Colorado populations.

Sage-grouse use extensive landscapes throughout the year and can move great distances or have annual migratory patterns. Sage-grouse are wide ranging because they require a diversity of seasonal habitats, and have special dietary requirements. Sage-grouse may use small portions of many different landscape types during different life stages and movements between small seasonal ranges may be extensive. Habitat requirements may be segregated into requirements for 4 seasons: breeding habitat, summer – late brood-rearing habitat, fall habitat, and winter habitat. In some situations, fall and summer – late brood-rearing habitats are indistinguishable. The breeding habitat category includes leking, pre-laying female, nesting, and early brood-rearing habitat. Summer – late brood-rearing habitat includes male, non-brooding female and brood habitats. Fall habitat consists of transition range from late-summer to winter, and can include a variety of habitats used by males and females. Winter habitat is used by segregated flocks of males and females. All habitat types must be present in sufficient quantity and quality to sustain sage-grouse populations.

Sage-grouse require sagebrush throughout the year for food and cover. The sage-grouse does not possess a muscular gizzard and lacks the ability to grind and digest seeds. With exception of insects in the summer, the year-round diet of the adult sage-grouse consists of leafy vegetation. Forbs dominate the summer diet and sagebrush leaves are used the rest of the year. Chicks are precocial and leave the nest with the hen shortly after hatching. The availability of food and cover are key factors related to chick and juvenile survival. During the first three weeks after hatching, insects (beetles, ants, grasshoppers) are the primary food. Diets of 4 to 8 week old chicks have more plant material. Succulent forbs are predominant in the diet until chicks exceed 3 months of age, at which time sagebrush becomes a major dietary component.

Each population has been analyzed for influential activities, threats, and conservation management needs within the Gunnison Sage-grouse Rangewide Conservation Plan (2004). In general threats influence the risk of permanent sage-grouse habitat loss through urban development, potential habitat linkages among populations, population viability, population augmentation options, population size in relation to the amount of available habitat, and population targets. These threats include agricultural conversion, disease and parasites, fire management, genetics of isolation, grazing, hunting, lek viewing, mining, energy development, human community infrastructure, noxious weed invasion, pesticides, predation, and recreational activity.

**Effects Analysis:** Plan Revision activities that could potentially influence the Gunnison sage-grouse primarily involve fuels treatment activities, fluid minerals development within the Paradox Basin (conventional and Gothic shales), livestock grazing, and motorized and non-motorized recreation.

***Direct/Indirect Effects:*** The Gunnison sage grouse occurs in two disjunct populations of BLM lands in the far west (Paradox Basin) portion of the SJPL. Its range could therefore overlap several planned activities. Wildlife habitat improvements intended specifically for sage-grouse could also influence the species. Differences in outputs associated with these activities are displayed below in Table S-BE-8.

**Table S-BE-8: Activities and Projected Outputs that could Potentially Influence the Gunnison Sage-Grouse, by Alternative**. *(Previously published with DEIS and updated for supplemental BE analysis)*

| ***Fluid Minerals Acreage*** <br> ***Available & Stipulated*** | ***Alternative A*** | ***Alternative B*** | ***Alternative C*** | ***Alternative D*** |
|---|---|---|---|---|
| * Acres Not Available | 504, 622 | 535,645 | 535,645 | 535,645 |
| * Acres Open for Leasing | 2,136,779 | 2,108,476 | 2,108,476 | 2,108,476 |
| * No Surface Occupancy | 219,011 | 965,422 | 965,422 | 920,484 |
| * Controlled Surface Use | 294,515 | 183,058 | 183,058 | 195,642 |
| * Timing Limitations | 246,214 | 495,461 | 495,461 | 513,724 |
| * Standard Lease Terms | 1,377,039 | 488,591 | 488,591 | 502,938 |
| * New Well Pads Anticiapted w/i the Paradox Basin (conventional) | 147 | 139 | 139 | 144 |
| * New Well Pads Anticiapted w/i the Paradox Basin (Gothic shale) | 406 (FS 291 and BLM 115) | 396 (FS 281 and BLM 115) | 391 (FS 276 and BLM 115) | 401 (FS 286 and BLM115) |
| ***Wildlife Management*** | | | | |
| * Habitat improvements specifically for sage grouse | 200 ac. 3 sites | 900 ac. 3 sites | 900 ac. 3 sites | 300 ac. 2 sites |
| Fuels Treatment Acres (Suitable Cover Types Only) | | | | |
| * Pinyon/Juniper | 1000 Mastication | 1000 Mastication | 1000 Mastication | 1100 Mastication |
| Livestock Grazing (Cattle AUMs Only) | | | | |
| * Premitted AUMs (BLM) | 22,101 | 22,100 | 16,530 | 22,290 |
| Motorized recreation (Acres, Winter Travel) | | | | |
| * Roaded natural | 696,652 ac. | 544,617 ac. | 486,765 ac. | 644,084 ac. |
| * Semi-primitive motorized | 683,371 ac. | 402,285 ac. | 232,249 ac. | 628,249 ac. |

| | | | | |
|---|---|---|---|---|
| * Semi-primitive non-motorized | 440,948 ac. | 879,149 ac. | 580,347 ac. | 556,288 ac. |
| * Primitive | 0 ac. | 2,632 ac. | 530,865 ac. | 0 ac. |
| * Primitive Wilderness | 536, 290 ac. | 536,291 ac. | 536,291 ac. | 536,291 ac. |
| Motorized recreation (Acres, Summer Travel) | | | | |
| * Roaded natural | 957,909 ac. | 647,407ac. | 569,731 ac. | 699,274 ac. |
| * Semi-primitive motorized | 414,152 ac. | 746,407ac. | 595,821 ac. | 779,219 ac. |
| * Semi-primitive non-motorized | 433,277 ac. | 433,520 ac. | 133,994 ac. | 351,735 ac. |
| * Primitive | 486,844 ac. | same as winter | 530,861 ac. | 0 ac. |

There are many challenges associated with the management and continued persistence of Gunnison sage-grouse. The primary threat, however, is the permanent loss and associated fragmentation of sagebrush (Gunnison Sage-grouse Rangewide Steering Committee 2005). These threats are amplified by land ownership patterns where the risk or urban expansion and/or habitat conversion is high in some locations. Currently, the majority of the occupied habitat occurs on private land and the amount of conservation benefit provided by lands administered by the PLC is minimal for most subpopulations. In the Dove Creek area, for example, private lands comprise roughly 87% of the occupied habitat while BLM lands provide approximately 13%. The amount of PLC lands is even smaller for the Miramonte and Hamilton Mesa subpopulations, where BLM lands comprise about 2% and 4% of the occupied habitat, respectively. In the Dry Creek area, however, most (57%) of the occupied habitat occurs on BLM lands and the PLC may therefore have more of a management influence on the subpopulation. As of 2004, there were no breeding leks associated with any lands administered by the PLC for any of the subpopulations and all available habitat was utilized for other seasonal habitat values.

Oil and gas developments are not currently mentioned as a conservation concern for any Gunnison's sage-grouse population or sub-population associated with SJPL (Gunnison Sage-Grouse Rangewide Conservation Plan 2005). As displayed in Table S-BE-8, however, 553 new well pads are anticipated in the Paradox Basin under the life of the Plan Revision (approximately 15 years). At this time, the exact location of where these wells may occur is unknown and potential impacts cannot be fully assessed. Under Alternative A, approximately 56% more of the new well developments in the Paradox Basin would occur under standard lease stipulations that offer fewer protective measures for sage-grouse and other sensitive wildlife species. It is noted, however, that while Alternative A will be leased with only the standard leasing stipulations, this alternative must comply with all DLMP components including standards, guidelines, and other referenced guidance. These plan components will be applied as conditions of approval in subsequent NEPA for development under this alternative. The protective leasing stipulations that apply to Alternatives B, C, and D were designed from DLMP components which provide essentially the same protections for the four action alternatives. Under the "no new lease" scenario only the existing lease areas have potential for development under this alternative resulting in fewer acres of potential influence to the species.

Approximately 1,000 acres of fuels treatment activities could occur in pinyon-juniper cover types in Alternative A. This activity consists primarily of hydromowing or other mechanical treatments to reduce juniper densities. This activity could be expected to benefit sage-grouse if it occurs in occupied habitat because it can reduce post-fire suppression juniper expansion and promote forage species. Alternative A also proposes to implement wildlife management activities intended to improve sage-grouse habitat on 200 acres within three occupied sites. This activity could be associated with additional juniper treatments, sagebrush treatments, riparian habitat improvements, or other activities that would benefit sage-grouse some portion of their life cycle. These wildlife management activities are expected to improve sage-grouse habitat to a lesser degree than the action alternatives because Alternative A involves fewer treatment acres.

Livestock grazing can have negative influences on Gunnison sage-grouse if they overlap occupied habitat. Impacts to riparian areas and understory forage plants are of particular concern because of their importance to breeding hens and new broods. Livestock grazing is not noted as an activity of conservation concern for the populations on SJPL in the Rangewide Conservation Plan. As displayed in Table BE-8, however, Alternative A, B, and D maintain the highest permitted forage allocation to livestock and are therefore assumed to have a potential for negative impacts to sage-grouse if the activities overlap.

Motorized and non-motorized recreation is not noted as an activity of conservation concern for the populations on SJPL in the Rangewide Conservation Plan. However, it is possible that Alternative A provides a higher risk of impact to individual sage-grouse because there is more "suitable opportunity" land for motorized travel in areas administered by the Dolores Field Office. A higher amount of travel and human activity area could potentially disturb grouse or their broods and/or damage soils, understory plants, or other habitat components utilized by the species.

In regards to fluid minerals activities, all action alternatives are expected to have fewer potential impacts on sage-grouse than Alternative A because they all involve fewer lease acres and potential development.

All alternatives are expected to have similar potential effects on sage-grouse because they all involve similar lease stipulations and/or DLMP component requirements. Currently, however, there are no known lek sites on SJPL. Under the "no new lease" scenario only the existing lease areas have potential for development under these alternatives resulting in fewer acres of potential influence to the species.

As in Alternative A, approximately 1,000 acres of mechanical fuels treatment activities could occur in pinyon-juniper cover types in all of the action alternatives. Similar effects and benefits are therefore anticipated if these activities occur in association with occupied sage-grouse habitat. All action alternatives also propose to implement wildlife management activities designed specifically for sage-grouse habitat improvement. Alternative B and C are associated with the greatest amount of habitat improvement on three occupied sites while Alternative D decreases this amount similar to Alternative A. The greatest benefits are expected to be associated with the most amount of treatment on the most sites.

As displayed in Table S-BE-8, livestock grazing activities in Alternatives B and D are similar to Alternative A and maintain a high amount of permitted forage allocation to livestock. Potential effects from livestock grazing in these alternatives are therefore expected to be similar. Alternative C reduces the amount of permitted livestock AUMs by about 25%. Some benefits may therefore be expected. However, the overall influence of livestock grazing is not expected to differ from the other action alternatives because grazing is not noted as a current concern to the sage-grouse populations on SJPL.

All action alternatives reduce potential impacts to sage-grouse from motorized travel in a similar manner. All alternatives tighten the boundaries on the amount of "suitable opportunity" land for motorized travel on lands administered by the Dolores Field Office. Travel is restricted to areas that already have existing and desirable motorized routes, and identify areas without existing routes as unsuitable. It is likely that these travel management actions will reduce the amount of conflict that could potentially occur to sage-grouse and their important habitat components.

***Cumulative Effects:*** Gunnison sage-grouse currently occupy a small fraction of their historical range, and have been extirpated from much of their presumed historical distribution due to habitat conversion (Gunnison Sage-grouse Rangewide Steering Committee 2005). Although their distribution was probably always somewhat fragmented, the amount of fragmentation has been greatly increased because of habitat loss. As of 2004, the total population of this species was estimated at approximately 3,200 breeding birds in seven populations, 75% of which occurred in the Gunnison Basin. The Gunnison sage-grouse remains a species of conservation interest on San Juan Public Lands because two small populations occur on lands administered by the BLM and because of continued habitat and population viability concerns.

The Gunnison Sage-Grouse Rangewide Conservation Plan was completed in early 2005 to supplement the information in the local conservation plans and provide a rangewide perspective regarding the conservation on Gunnison sage-grouse. The SJPL is committed to assisting and participating in this plan through a formal Conservation Agreement signed by both the Forest Service and the BLM in April 2005. Conservation efforts for the Gunnison sage-grouse on the SJPL will continue through the opportunities identified in these plans and through local partnerships as opportunities arise. While cumulative effects have been occurring and will most likely continue to occur to these small populations of sage-grouse, the species is a priority for conservation action on SJPL. These actions are anticipated to minimize potential cumulative effects on public lands ands assist in the recovery of the species.

**Determination:** All Plan Revision alternatives, including Alternative A, "**may adversely impact individuals (Gunnison sage-grouse), but would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide."** The rationale for this determination is as follows:

- Two small populations of Gunnison sage-grouse occur on BLM administered lands on SJPL. Most of the habitat for one population is associated with private lands. The BLM administers approximately 57% of the land occupied by one population.
- The primary threats to sage-grouse populations associated with the SJPL involve habitat conversions and activities on private lands.
- Some Plan Revision activities could overlap occupied sage-grouse habitat and have negative influences on the species.
- The SJPL is a co-signer to a statewide Conservation Agreement intended to conserve and recover the Gunnison sage-grouse.
- The SJPL adheres to the Rangewide Conservation Plan for Gunnison sage-grouse and is taking action to maintain and improve habitat conditions.

# FISH

## *Gila robusta* (Roundtail Chub)

**Distribution:** The roundtail chub is an endemic species to the Colorado River Basin in Colorado and Wyoming (Rees, Ptacek, and Miller 2005). Historically, roundtail chubs were known to commonly occur in most medium to large tributaries of the Upper Colorado River Basin (Vanicek 1967, Holden and Stalnaker 1975, Joseph et al 1977). Roundtail chubs historically occur in lower elevation streams, including the Colorado, Dolores, Duchesne, Escalante, Green, Gunnison, Price, San Juan, San Rafael, White, and Yampa rivers (Bezzerides and Bestgen 2002).

The roundtail chub is not restricted to large rivers within the Colorado River Basin. Populations currently exist in western Colorado and southcentral Wyoming. Miller and Rees (2000) described historical and recent accounts of roundtail chub in the mainstream of the San Juan River and various tributaries in the southwestern portion of Colorado and in New Mexico. These tributaries include the Animas, Florida, La Plata, and Mancos rivers as well as Navajo Wash (tributary of the Mancos River).

The current distribution of roundtail chub on Federal lands in Colorado appears to be very limited. However, the San Juan Public Lands contain a documented population of roundtail chubs (Gerhardt, 2003, pers com); this population occurs in the Dolores River, downstream from McPhee Reservoir, Colorado. Several roundtail chub populations exist in tributary streams immediately downstream of Federal lands in Colorado. These tributary streams include Divide Creek and Rifle Creek (tributaries to the Colorado River), Elkhead Creek (tributary to the Yampa River), and Florida River, La Plata River, and Los Pinos River (San Juan River drainage).

**Reason for Concern:**Roundtail chubs have been extirpated from 45% of their total historical habitat, especially portions of the Price, San Juan, Gunnison, and Green rivers (Bezzerides and Bestgen, 2002). A decline in populations has been observed in the Animas, Green, Gunnison, Salt, San Juan, White, and Yampa rivers (Minckley 1973, Platania 1990, Wheeler 1997, Lentsch et al 1998, Propst and Hobbes 1999, Bestgen and Crist 2000, Miller and Rees 2000).

The decline in roundtail chub populations can be attributed with the construction of dams and reservoirs between the 1930's and 1960's, introduction of non-native fishes, and removal of water from the Colorado River system (Rees, Ptacek, and Miller 2005). Dams, impoundments, and water use practices (eg., diversion ditches) are probably the major reasons for modified natural river flows and channel characteristics in the both mainstem rivers and tributary streams. Dams on the mainstem rivers have segmented the river system, blocking spawning migrations, and changing flows and temperatures (eg., conversion of warm water habitat to cold water habitat). Other water use and development projects have reduced or eliminated suitable habitat due to water depletions and reduced stream flows. Major changes in species composition have occurred with the introduction of non-native species. The decline of roundtail chub seems related to predation, competition, or other behavioral interactions with non-native fishes. Alterations in the natural fluvial environment from land management activity has exacerbated this problem (USFWS 1995).

**Life History:** Roundtail chubs evolved in the Colorado River Basin below an elevation of of approximately 7500 ft. Most reaches of this system receive heavy sediment loads and high annual peak flows that contrast with low base flows. Little is known about the specific influence of these annual events, but healthy roundtail chub populations have persisted in habitats with a wide range of annual flows, sediment transport, and even sediment deposition, providing that these physical events are associated with a natural flow regime (Rees, Ptacek, and Miller 2005).

Roundtail chub live in big rivers and tend to occupy slow-moving waters (Woodling 1985). Murky, rather than clear, water is sought (Sigler and Sigler 1996). Rountail chub are often found in stream reaches that have a complexity of pool and riffle habitats (Bezzerides and Bestgen 2000). Juveniles and adults are typically found in relatively deep, low-velocity habitats that are often associated with woody debris or other types of cover (Vanicek and Kramer 1969, McAda et al 1980, Miller et al 1995, Beyers et al 2001, Bezzerides and Bestgen 2002). Sigler and Sigler (1996) reported that substate in roundtail chub habitat may range from rock and gravel to silt and sand. Temperature tolerance of roundtail chub has been reported up to 39 oC, but temperature preference ranges between 22 and 24 oC (Weitzel 2002).

The life history phases that appear to be most critical for the roundtail chub include spawning, larvae development, and feeding of the young through the first year of life. In most Colorado River tributaries, natural spawning is initiated on the descending limb of the annual hydrograph as water temperatures approach 18-20oC (Bezzerides and Bestgen 2002). Spawning occurs from July 1 to September 1, although high flow water years may suppress temperatures and extend spawning into September. Conversely, during low flow years when water warms earlier, spawning may occur in late June (USFWS 1995). Depending on water temperature, eggs usually hatch within four to 15 days after spawning.

There is a downstream drift of larvae following hatching (Haines and Tyus 1990). Drifting occurs primarily after mid-July and appears to become more frequent as water termperatures initially increase. From late summer through fall, young of the year roundtail chub prefer natural backwater areas of zero to low velocity.

Very little information is available on the influence of turbidity on the sensitive Colorado River fishes. It is assumed that turbidity is important particularly as it affects the interaction between introduced fishes and the endemic Colorado River fishes. Because these endemic fishes have evolved under natural conditions of high turbidity, it is probable high turbidity is important. Reduction of turbidity may enable introduced species to gain a competitive edge which could further contribute to the decline of roundtail chub (USFWS 1995).

**Effects Analysis**

**Direct and Indirect Impacts For All Alternatives**

The anticipated levels of land management activities that are associated with each alternative are displayed in Chapter 2 of this EIS.

Except for some general area descriptions for oil and gas leasing and development (eg., San Juan Sag east of Pagosa Springs and Paradox Basin in the Glade, Disappointment Valley, and Dolores River Canyon areas on the western side of the Unit), uranium and vanadium exploration and development (western Dolores Ranger District/Field Office), and a few other activities, specific locations and details for many management actions are unknown. Although most historic management activities (eg., livestock grazing, etc) will continue to occur in the general vicinity that they are now occurring, precise effects cannot be determined until the location, timing, size, and exact design of the projects are known. As a result, these effects on sensitive fish species are discussed in general terms.

Areas on the Unit with salinity issues, high road densities, and/or sensitive to disturbance (eg., Dolores River watershed) are identified in Chapter 3.3 (“Water” Section) of this EIS. This information is factored into the effects analysis that follows.

Desired Conditions, Objectives, Design Criteria, and Guidelines from the accompanying Forest Plan/RMP Revision that pertain to each sensitive fish species are identified in Appendix M, Table M.2 of this EIS. These Revision components apply to all alternatives and help minimize impacts on aquatic species. They also include Forest Service and BLM manuals and handbooks, such as the Forest Service’s Watershed Conservation Practices Handbook and BLM’s Surface Operating

Standards and Guidelines for Oil and Gas Exploration and Development, which prescribe extensive measures that apply to certain management activities that protect soil, riparian, and aquatic resources. In addition, lease stipulations on new oil and gas leases are listed in Appendix H of this EIS and help protect and minimize effects to aquatic resources.

As previously stated, water diversions and depletions have had the greatest effect on roundtail chubs and other warm water sensitive fish species. Water diversions and depletions occur as a result of municipal and domestic uses, water storage, irrigation, stock ponds, transbasin diversions, snowmaking, and numerous other reasons. The effects from water use and development projects (including diversion ditches, storage reservoirs, pipelines, wells, etc) are reduced or eliminated stream flows and reduced or eliminated fishery habitat that is not available for use. Water depletions reduce peak flow and durations. This causes losses of backwater pools for spawning and rearing. It also reduces suspended sediments which may confer a competitive advantage on non-native species. Additional impacts include increased stream temperatures and reduced dissolved oxygen levels. These effects could be more pronounced during periods of natural cyclic flow reductions (in fall and winter) or during summer months in a drought.

The effects from water use and development projects would likely be moderately adverse to roundtail chubs immediately downstream from these projects found in the Dolores, Mancos, LaPlata, Animas, Florida, Los Pinos, and San Juan rivers or their major tributaries (Navajo Wash for the Mancos River) at the lower elevations of the San Juan Public Lands under all alternatives. The impacts of reduced or eliminated fishery habitat would result from water depletions and reduced stream flows. The impacts are not expected to vary between alternatives since the demand for water use authorizations are driven by proponents rather than by San Juan Public Land's programs or budgets. Because the effects of water use and development projects are speculative, more precise effects cannot be determined until the location, timing, size, and exact design of the projects are known.

Livestock grazing can degrade in-stream habitat and water quality. Effects generally are increased sedimentation, increased stream temperatures, and fecal/bacteria contamination. The effects from livestock grazing and big game use under all alternatives may adversely affect specific individuals but would overall be minor for the populations of the roundtail chub. Because of the lag time to influence existing conditions, Alternative C with its reductions in suitable and available livestock grazing areas may reduce grazing effects on fisheries from the present conditions in the long-term, but not in the short-term. For Alternative D with its increases in suitable and available livestock grazing areas, grazing may increase effects on these fisheries from the present in the long-term, but not in the short-term. Although there will be localized improvements in grazing management and implementation of rangeland health improvement projects, the impacts of sediment and increased water temperatures on fishery habitat quality should continue.

The effects of roads are primarily through sediment production. Eroded material may be delivered to streams as fine sediment and deposited in channels or transported downstream. The actual amount of sediment from these land disturbing activities that reaches stream channels or still water bodies would be a result of numerous factors including the location of roads, number of road/stream crossings, slope steepness and length, amount of exposed soil, type of vegetation in the area, frequency and intensity of rainfall, soil type and the implementation and effectiveness of BMPs Heavy sediment loads can reduce pool depths, bury stream substrates and spawning gravels, adhere to aquatic insects and the gills of fish, alter channel form and function, and result in other forms of habitat degradation. Improperly placed, shaped, and sized culverts can act as fish barriers on key streams or exacerbate erosion and cause head-cutting. Elevated salinity levels, over extended periods of time, may become toxic for aquatic ecosystems and fish species.

Generally, the effects from roads may adversely affect specific individuals but overall would be minor for the populations of roundtail chubs found in the LaPlata, Animas, Florida, Los Pinos, and San Juan rivers and their tributaries at the lower elevations of the San Juan Public Lands under all alternatives. Specific projects with new road construction in the Dolores or Mancos river drainages (including the Navajo Wash drainage) could likely result in moderately adverse effects to the roundtail chub because of the salinity issues and higher sediment production from these sensitive watersheds. Again, since the exact details for these projects are unknown presently, the impacts continue to be speculative.

Reasonably foreseeable future oil and gas development is projected to impact watersheds east of Pagosa Springs (in the San Juan Sag area) predominately on national forest lands, and on the BLM portion (in the Disappointment Valley, Big Gypsum Valley, and Dry Creek Basin, and along the Dolores River Canyon) and on the national forest portion (in the Glade and McPhee Reservoir areas, and along the Dolores River Canyon) of the Paradox Basin. Within the Paradox Basin, there are two types of possible gas development (ie., conventional gas and Gothic Shale gas). In the San Juan Sag area, exploration could include one to two wildcat wells per year.

The Paradox Basin would develop as a field of 1,350 federal wellpads within an area of approximately 400,000 acres. The progression of development would involve an exploratory phase of approximately seven years followed by full field development in which over 100 wells are drilled per year. Paradox Basin gas development would result in direct impact of approximately 4,500 acres due to well and road construction. Approximately 40-percent of this development would be on existing leases and 60-percent on future leases. This level of disturbance would involve clearing of approximately one-percent of total land area where development is projected.

New gas development on 80-acre spacing units in the Northern San Juan Basin would result in 200 new or expanded federal well pads with a corresponding 300 acres of disturbance within a 125,000 acre area. All San Juan Basin development would be on existing leases and guided by best management practices.

Where oil and gas facilities are developed within the prospective areas, soil erosion and sediment deposition, and corresponding potential to impact aquatic and riparian habitat would be limited first by implementing the above lease requirements that require avoidance of sensitive, erosion prone areas and riparian areas, and secondly by the application of the design criteria listed above, that include, for example, graveling road surfaces to avoid dust and loss of soil to wind erosion; revegetating or covering any soil stockpiles that would remain for extended periods to avoid significant wind and water erosion; installing slope breaks and silt fences on slopes to slow and filter storm water runoff that might carry exposed soils to surface water drainages; timely reclamation of disturbed areas to minimize erosion after construction of facilities; and avoiding locations having highly erosive soils where possible. Non productive wells, referred to as dry-holes, would immediately be reclaimed.

Overall, the impacts to fisheries and aquatic species from oil and gas leasing and development within the San Juan Sag, the Paradox Basin, and the Northern San Juan would be mainly related to reduced stream-flows over time due the water used in the drilling and completion process and to the dewatering of gas-producing rock formations. This would, subsequently, reduce fishery habitat available for use, magnify any increased sediment effects, and result in degraded fishery habitat (as well as in the potential for contamination from petroleum products, drilling mud, and other contaminants).

During oil and gas development, water can be removed from the ecosystem by two ways. First, generally small amounts of water will be used during the drilling and completion process, except in the development of Gothic Shale gas which requires larger quantities of water. Typically, this water is hauled on-site by water trucks and removed as a waste sludge. This water usage occurs with all drilling operations. Water is also used in dust abatement to these well pads and during hydrostatic testing of pipelines. Second, water can be depleted during gas field production. Here, water is produced or pumped from the gas producing formations in order to release the pressure on the gas tied-up in the seam and allow it to flow. For coalbed methane gas wells for instance, this water is transported to a disposal well for re-injection into a formation several thousand feet lower than where it was removed. Because of the possible connectivity of this produced groundwater to surface water streams, gas production may affect stream-flow.

For conventional, coalbed methane, and Gothic Shale gas wells, approximately 1.4 acre-feet per well, 0.7 acre-feet per well, and 7.9 to 13.1 acre-feet per well of water, respectively, are anticipated to be used in the well drilling and completion process. The level of water used for Gothic Shale gas wells (GSGP) in the Paradox Basin is 6 to 11times the amount of water used to drill and complete a conventional gas well, and 11 to 18 times the amount of water used to drill and complete a coalbed methane gas well. It is assumed that all water associated with GSGP gas development and production would have to be purchased and trucked into the project area, as the water would not be obtained from water sources on public land. The sources of this private water are unknown, but would occur within the San Juan River Basin and Dolores River Basin. Since this water is connected to a Federal action, it is considered a depletion from a major river basin, and would require preparation of a biological assessment and coordination and consultation with the US Fish and Wildlife Service (FWS) for threatened and endangered species (TES), under Section 7 of the Endangered Species Act. Because of difficulties in quantifying effects on stream-flow, water depleted due to gas field production was not estimated.

For Alternative A, as an example, the two tables below describe the water used in the drilling and completion process. Table S-BE-3 displays the acre-feet of water used over 15 years for the future and existing leases on combined Forest Service and BLM public lands, and on non-Federal leases. Table S-BE-4 describes the average, annual acre-feet of water used by the Forest Service and BLM for the future leases during the exploratory and production phases by river basins.

**Table S-BE-9 - Water Used in Well Drilling and Completion (Acre-Feet) Over 15 Years for both Forest Service and BLM Public Lands**

| **Projected Development Areas** | Future Leases | Existing Leases | Non-Federal Leases | Total |
|---|---|---|---|---|
| **Paradox** | 5,657 | 3,275 | 6,572 | 15,504 |
| **Northern San Juan Basin** | 0 | 296 | 268 | 564 |
| **San Juan Sag** | 35 | 7 | 0 | 42 |
| **Total** | 5,692 | 3,578 | 6,840 | 16,110 |

**Table S-BE-10 – Average Annual Water Used in Well Drilling and Completion (Acre-Feet/Year) for Future Leases on Forest Service and BLM Public Lands by River Basins**

| | Years | Dolores River | San Juan River | Total |
|---|---|---|---|---|
| Forest Service | 1 to 7 | 62 | 4 | 66 |
| Forest Service | 8 to 12 | 364 | 21 | 385 |
| Forest Service | 13 to 15 | 534 | 30 | 564 |
| BLM | 1 to 7 | 23 | 5 | 28 |
| BLM | 8 to 12 | 117 | 29 | 146 |
| BLM | 13 to 15 | 182 | 46 | 228 |

The effects of oil and gas leasing and development, generally similar for all alternatives, could likely be moderately adverse to the roundtail chub downstream from this activity found in the Dolores, Mancos, LaPlata, Animas, Florida, Los Pinos, and San Juan rivers or their tributaries (Navajo Wash for the Mancos River) at the lower elevations of the San Juan Public Lands. The impacts are mainly due to water depletion and reduced stream flows over time and subsequently reduced fishery habitat available for use. Since the effects from oil and gas development are speculative, more precise effects cannot be determined until the location, timing, size, and exact design of the projects are known. There would be concerns for new oil and gas development in the Dolores or Mancos river watersheds (including the Navajo Wash drainage) with salinity issues, high road densities, or sensitive to disturbance (eg., degraded fishery habitat). If no new leases were made available, the impacts on the roundtail chub would be as a result of existing leases only.

Mining activities on the San Juan Public Lands can include recreational gold panning and suction dredging, gravel mining operations, hard-rock mining, uranium and vanadium mining, etc. Chapter 2 displays the potential acreage of disturbance per year from these activities. The effects to fisheries and aquatic species from mining or mining reclamation are mainly from erosion and sediment impacts (eg., degraded fishery habitat), saline runoff or heavy metal loading of streams (eg., toxic levels for aquatic species), and altered stream channels and associated fishery habitat.

Generally, the effects of mining and mining reclamation, mostly similar under all alternatives, may adversely affect specific individuals but would overall be minor for the populations of roundtail chub found in the LaPlata, Animas, Florida, Los Pinos, and San Juan rivers at the lower elevations of the San Juan Public Lands. Specific uranium and vanadium mining projects in the Dolores or Mancos river drainages (including the Navajo Wash drainage) under all alternatives with salinity issues, high road densities, or sensitive to disturbance would likely result in minor adverse effects to the roundtail chub because of populations in other unaffected drainages. Again, since the exact details for these projects are unknown presently, the impacts continue to be speculative.

Timber harvesting within Forest Service standards has little impact on stream habitats except for the roads and trails necessary to skid logs to landings and to haul logs to mills. Construction and use of the roads exposes soil and may accelerate erosion. If these areas of bare soil are connected to the stream network, sedimentation can occur. Connectivity of disturbed areas can be due to road crossings, rills, gullies, and poorly designed road drainage systems. Fine sediments in streams can reduce spawning habitat and limit macroinvertebrate populations. If sediment enters the stream during incubation, it can smother the eggs. Sediment can also deposit in pools and reduce pool depth and volume. Adult fish may move out of these pools to find more suitable areas.

The effects from vegetation management may adversely affect specific individuals but would overall be minor for the population of roundtail chubs. Since all alternatives have generally the same levels of timber harvest, hazardous fuels treatment, etc. (only 1800 acres separate Alternative D with the greatest levels of harvest and Alternative C with the least amount of vegetation treatment), the effects would be nearly the same for all alternatives. Again, the impacts are driven by sediment and stream temperature influences on fishery habitat quality.

In regard to air quality, the effects of oil and gas development and other management activities on the roundtail chub would be negligible over the life of the Management Plan. The Air Analysis was focused on the entire Unit, not just the Gothic Shale area in the Paradox Basin. It is a modeling effort with many assumptions, including a gas development scenario as depicted in the Reasonably Foreseeable Development (RFD). The potential impacts of nitrogen loading or sulfur dioxide deposition to lakes, streams, and the aquatic ecosystems and fish species would be a very slow and prolonged process. It would probably be very difficult to detect any measureable effects on aquatic ecosystems well beyond the life of the Management Plan.

**Cumulative Impacts**

Roundtail chubs are Forest Service and BLM sensitive species as a result of past cumulative effects, locally and regionally. For all alternatives, the primary adverse cumulative effects on this warm water species, found in the Dolores, Mancos, LaPlata, Animas, Florida, Los Pinos, and San Juan rivers and their tributaries (Navajo Wash for the Mancos River) at the lower elevations of the San Juan Public Lands, presently, would occur from activities that lead to additional water depletions and reduced stream flows (ie., reduced or eliminated fishery habitat that is available for use). Again, these activities would mainly be water use and development projects on or off the San Juan Public Lands, or oil and gas development from current leases and projected new leases on or off the San Juan Public Lands. The demands for water use and development projects are difficult to analysis because they are driven by proponents rather than by San Juan Public Land's programs or budgets. Because of heightened concerns about sediment and salinity inputs and downstream effects on fishery habitat quality, ground-disturbing activities (new road construction, uranium and vanadium mining, etc) in the Dolores or Mancos river watersheds (including the Navajo Wash drainage) may also adversely affect the roundtail chub. However, since the exact details for these projects and activities in the Dolores or Mancos river watersheds are unknown presently, the impacts continue to be speculative.

Water depletions from the oil and gas leasing and development on the San Juan Public Lands would be moderately adverse to the roundtail chub immediately downstream. These water depletions would result either from the generally small amounts of water used during the drilling and completion process for each individual well (except in the development of Gothic Shale gas which requires larger quantities of water) and/or from possible dewatering of the gas producing formations during gas field production. For all the future leases on both Forest Service and BLM public lands, about 85 acre-feet per year and 9 acre-feet per year would be used in the drilling and completion process in the Dolores and San Juan river basins, respectively, for the first seven years (predominately the exploratory phase). The first development phase (years 8 through 12) would require 481 and 50 acre-feet per year of water for the drilling and completion process in the Dolores and San Juan river basins, respectively. The major production phase (years 13 through

15) would require 716 and 76 acre-feet per year of water in the Dolores and San Juan river basins, respectively.

These water depletions are small relative to the total, historic depletions within these river basins. For instance, as of December 31, 2002, the US Fish and Wildlife Service recognized that there was 846,192 acre-feet per year of water depletions from federal actions within the San Juan River Basin. Of this, 241,814 acre-feet per year were associated with federal actions in Colorado (USFWS 2003). Depletions associated with non-federal actions (private or State activities) increase these values considerably.

It is likely there will be cumulative effects from as many as 2,500 new gas wells drilled on or adjacent to the San Juan Public Lands over the next planning period. In addition to an estimated 800 new wells that may be drilled on new leases (discussed under Direct and Indirect Impacts), there could be as many as 200 new and infill gas wells drilled in the northern San Juan Basin, 1000 new wells drilled on the Southern Ute Tribal lands adjacent to the Unit, and 1300 new wells on previously leased land in the Paradox Basin. The Reasonable and Foreseeable Development projected wells would require new roads, pipelines and associated disturbance for gas well construction. Consequently, oil and gas development may have large potential to have substantial cumulative effects when compared to all other activities that affect the San Juan Public Lands. The magnitude of new road/pipeline construction and other disturbances would vary only slightly by alternative.

Although not attributed to management activities on the San Juan Public Lands, the urbanization or development of intermixed private lands within or immediately adjacent to the Unit would have potential effects. Continued development of these lands for residential purposes has the potential at affect fisheries and aquatic resources. Increased runoff and sedimentation from paved and unpaved roads, roofs, and driveways, increased use of surface and groundwater, increased use of herbicides, pesticides, and fertilizers, and increased recreation uses on adjacent public lands can all be attributed to urbanization. If activities on intermixed private lands approach tolerance limits for watershed disturbance, additional activities on the Unit may be limited or curtailed to avoid adverse and cumulative effects to watersheds and aquatic ecosystems. With the amount of intermixed ownership within or immediately adjacent to the Unit, this effect could be moderate at the lower elevations of the public lands.

**Effects Determination**

Water depletions caused by oil and gas leasing and development on the San Juan Public Lands are relatively small compared to the total, historic depletions within these river basins. Since water use and development projects are proponent driven, the effects these projects would have on the roundtail chub are speculative but likely adverse immediately downstream of these activities. Although the roundtail chub distribution and abundance have diminished, they still occupy a wide geographic area and range of locations. Through the Desired Conditions, Objectives, Design Criteria, and Guidelines, effects to the roundtail chub would be minimized. Therefore, management activities in all alternatives associated with the Forest Plan/RMP Revision **MAY ADVERSELY IMPACT INDIVIDUALS, BUT NOT LIKELY RESULTS IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.**. However, it should be recognized that these water depletions from the Unit would contribute to the overall cumulative effects of water depletion within the San Juan and Dolores river basins. Some years into the future, the cumulative effects of water depletions within these basins could have the potential to comprise population viability within the planning unit and could possibly increase the probability of federal listing of the roundtail chub.

## Flannelmouth Sucker (*Catostomus latipinnis)*

**Distribution:** Flannelmouth sucker are endemic to the Colorado River Basin (Rees, Ptacek, Carr, and Miller 2005). Historically, the flannelmouth sucker was commonly found in most, of not all, medium to large lower elevation rivers of the Upper Colorado River drainage (upstream of Glen Canyon Dam). It was found in similar habitats of the Lower Colorado River drainage (downstream of Glen Canyon Dam), but in lesser numbers (Joseph et al 1977). Although this species is typically associated with large rivers, it also occurs in smaller tributaries and occasionally in lakes and reservoirs (Bezzerides and Bestgen 2002).

The flannelmouth sucker is still widely distributed in medium to large streams in the Upper Colorado River Basin, which includes the mainstream of the Colorado River, numerous tributaries that drain a large portion of Colorado, Wyoming, and Utah, and the San Juan River drainage in New Mexico (Holden and Stalnaker 1975). However, in many areas of the upper basin populations are thought to be decreasing (Sigler and Sigler 1996).

Within Colorado, flannelmouth sucker are currently present in streams and rivers that are not heavily impacted by impoundments or habitat degradtion. Flannelmouth suckers have been reported from the San Juan River and the following tributaries that occur in the southern portion of Colorado: Animas, Florida, La Plata, Los Pinos, Mancos, Navajo, and Piedra rivers, as well as McElmo Creek (Miller et al 1995, Miller and Rees 2000, Whiteman 2000). Some of these tributaries are located on San Juan Public Lands. The distribution parallels that of the bluehead suckers and they are often found together; however the flannelmouth sucker is not as common as the bluehead sucker on Forest Service and BLM lands. Available data provided by Miller and Rees (2000) suggested that the range of flannelmouth suckers in the Piedra and San Juan rivers (and possibly other tributaries) included lower reaches in the San Juan Public Lands. The flannelmouth sucker is known to occur on San Juan Public Lands of the upper San Juan River, Piedra River, Animas River, and the Dolores River (Mike Japhet, CDOW, 2006, pres. com.). Occurrence on Forest Service lands of the Piedra River is unlikely, but it is known to occur in the Piedra River downstream of Forest Service lands (Dave Gerhardt, 2006, pers com.).

**Reason for Concern: F**lannelmouth sucker populations have declined in abundance and distribution throughout their historic range (Bezzerides and Bestgen 2002, Weitzel 2002). Most of the decline has been attributed to construction of dams and reservoirs, activties that have diverted water or changed the natural regime in both tributary and mainstem streams and rivers, and introduction of non-native fish species (Rees, Ptacek, Carr, and Miller 2005). Dams on the mainstem Colorado River and its main tributaries have segmented the river system, blocking spawning migrations, altered channel geomorphology, and changed flows and temperatures (eg., conversion of warm water habitat to cold water habitat from hypolimnetic releases below dams). Other water use and development projects (eg., diversion ditches, etc) have reduced or eliminated suitable habitat due to water depletions and reduced stream flows. Major changes in species composition have occurred with the introduction of non-native species, especially the white sucker. The decline of flannelmouth sucker seems related to predation, competition, hybridization, or other behavioral interactions with non-native fishes.

At present, there is concern regarding the status of flannelmouth sucker in the Colorado River drainage (Rees, Ptacek, Carr, and Miller 2005). Although the specific mechanisms of most threats to this species are poorly understood, the flannelmouth sucker appears to be vulnerable throughout its range in the Upper Colorado River Basin due to the combined impacts of habitat loss, habitat degradation, habitat fragmentation, and interactions with non-native species. Of the three warm water sensitive species found on the San Juan Public Lands, the flannelmouth sucker appears more at risk than the roundtail chub or bluehead sucker from present water developments, water diversions, or drought effects (Dave Gerhardt, 2006, pers com.).

**Life History:**The flannelmouth sucker is considered a "big river" fish, preferring deeper, high-gradient riffles and clean substrates. Flannelmouth suckers are typically found in slower, warmer rivers of the Colorado River drainage (Deacon and Mize 1997). They usually inhabit the mainstem of moderate to large rivers but are occasionally found in small streams (Rees, Ptacek, Carr, and Miller 2005). This species frequents pools and deep runs but can also be found in the mouths of tributaries, riffles, and backwaters. Flannelmouth suckers are occasionally found in lakes or reservoirs, but they generally react poorly to impounded habitats, or habitats influenced by impoundments (Minckley 1973, Chart and Bergersen 1992).

Juvenile and adult flannlemouth suckers utilize most habitats and can be considered a habitat generalist. Juveniles and adults are most often found using run, pool, and eddy habitats (Joseph et al 1977, McAda 1977, Tyus et al 1982). This species appears to prefer temperatures around 25oC (Sublette et al 1990).

Flannelmouth sucker typically spawn in the Upper Colorado River Basin between April and June (McAda 1977, McAda and Wydoski 1983, Snyder and Muth 1990, Tyus and Karp 1990). Otis (1994) reports that spawning occurs at water temperatuers ranging from 12 to 15oC and that flannelmouth suckers in the Lower Colorado River Basin spawn six to eight weeks earlier than those in the upper basin. Flannelmouth spawning aggregations have been observed in tributaries of the Lower Colorado River in glides or slow riffles, over medium-coarse gravel substrate (Weiss 1993, Otis 1994).

There is downstream drift of larvae following hatching (Bezzerides and Bestgen 2002). Carter et al (1986) and Robinson et al (1998) suggest that larvae have the ability to actively enter and escape the draft. The draft mechanism likely accomplishes population dispersal and location of suitable larval habitat.

Hybridization between flannelmouth suckers and other species is a common occurrence throughout the range of the species. Flannelmouth sucker are known to hybridize with the following species of suckers: mountain, bluehead, desert, razorback, and the introduced white suckers (Bezzerides and Bestgen 2002). The most common, and perhaps the most detrimental, instance of hybridization occurs with the non-native white sucker. Also introduced white suckers compete with flannelmouth suckers for food resources.

Very little information is available on the influence of turbidity on the sensitive Colorado River fishes. It is assumed that turbidity is important particularly as it affects the interaction between introduced fishes and the endemic Colorado River fishes. Because these endemic fishes have evolved under natural conditions of high turbidity, it is probable high turbidity is important. Reduction of turbidity may enable introduced species to gain a competitive edge which could further contribute to the decline of flannelmouth sucker (USFWS 1995).

**Effects Analysis**

**Direct and Indirect Impacts For All Alternatives:** The anticipated levels of land management activities that are associated with each alternative are displayed in Chapter 2 of this EIS.

Except for some general area descriptions for oil and gas leasing and development (eg., San Juan Sag east of Pagosa Springs and Paradox Basin in the Glade, Disappointment Valley, and Dolores River Canyon areas on the western side of the Unit), uranium and vanadium exploration and development (western Dolores Ranger District/Field Office), and a few other activities, specific locations and details for many management actions are unknown. Although most historic management activities (eg., livestock grazing, etc) will continue to occur in the general vicinity that they are now occurring, precise effects cannot be determined until the location, timing, size, and exact design of the projects are known. As a result, these effects on sensitive fish species are discussed in general terms.

Areas on the Unit with salinity issues, high road densities, and/or sensitive to disturbance (eg., Dolores River watershed) are identified in Chapter 3.3 ("Water" Section) of this EIS. This information is factored into the effects analysis that follows.

Desired Conditions, Objectives, Design Criteria, and Guidelines from the accompanying Forest Plan/RMP Revision that pertain to each sensitive fish species are identified in Appendix M, Table M.2 of this EIS. These Revision components apply to all alternatives and help minimize impacts on aquatic species. They also include Forest Service and BLM manuals and handbooks, such as the Forest Service's Watershed Conservation Practices Handbook and BLM's Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, which prescribe extensive measures that apply to certain management activities that protect soil, riparian, and aquatic resources. In addition, lease stipulations on new oil and gas leases are listed in Appendix H of this EIS and help protect and minimize effects to aquatic resources.

As previously stated, water diversions and depletions have had the greatest effect on flannelmouth suckers and other warm water sensitive fish species. Water diversions and depletions occur as a result of municipal and domestic uses, water storage, irrigation, stock ponds, transbasin diversions, snowmaking, and numerous other reasons. The effects from water use and development projects (including diversion ditches, storage reservoirs, pipelines, wells, etc) are reduced or eliminated stream flows and reduced or eliminated fishery habitat that is not available for use. Water depletions reduce peak flow and durations. This causes losses of backwater pools for spawning and rearing. It also reduces suspended sediments which may confer a competitive advantage on non-native species. Additional impacts include increased stream temperatures and reduced dissolved oxygen levels. These effects could be more pronounced during periods of natural cyclic flow reductions (in fall and winter) or during summer months in a drought.

The effects from water use and development projects would likely be moderately adverse to flannelmouth suckers immediately downstream from these projects found in the Dolores, Mancos, LaPlata, Animas, Florida, Los Pinos, Piedra, San Juan, and Navajo rivers or their major tributaries, and McElmo Canyon at the lower elevations of the San Juan Public Lands under all alternatives. The impacts of reduced or eliminated fishery habitat would result from water depletions and reduced stream flows. The impacts are not expected to vary between alternatives since the demand for water use authorizations are driven by proponents rather than by San Juan Public Land's programs or budgets. Because the effects of water use and development projects are speculative, more precise effects cannot be determined until the location, timing, size, and exact design of the projects are known.

Livestock grazing can degrade in-stream habitat and water quality. Effects generally are increased sedimentation, increased stream temperatures, and fecal/bacteria contamination. The effects from livestock grazing and big game use under all alternatives may adversely affect specific individuals but would overall be minor for the populations of the flannelmouth sucker. Because of the lag time to influence existing conditions, Alternative C with its reductions in suitable and available livestock grazing areas may reduce grazing effects on fisheries from the present conditions in the long-term, but not in the short-term. For Alternative D with its increases in suitable and available livestock grazing areas, grazing may increase effects on these fisheries from the present in the long-term, but not in the short-term. Although there will be localized improvements in grazing management and implementation of rangeland health improvement projects, the impacts of sediment and increased water temperatures on fishery habitat quality should continue.

The effects of roads are primarily through sediment production. Eroded material may be delivered to streams as fine sediment and deposited in channels or transported downstream. The actual amount of sediment from these land disturbing activities that reaches stream channels or still water bodies would be a result of numerous factors including the location of roads, number of road/stream crossings, slope steepness and length, amount of exposed soil, type of vegetation in the area, frequency and intensity of rainfall, soil type and the implementation and effectiveness of BMPs. Heavy sediment loads can reduce pool depths, bury stream substrates and spawning gravels, adhere to aquatic insects and the gills of fish, alter channel form and function, and result in other forms of habitat degradation. Improperly placed, shaped, and sized culverts can act as fish barriers on key streams or exacerbate erosion and cause head-cutting. Elevated salinity levels, over extended periods of time, may become toxic for aquatic ecosystems and fish species.

Generally, the effects from roads may adversely affect specific individuals but overall would be minor for the populations of flannelmouth suckers found in the LaPlata, Animas, Florida, Los Pinos, Piedra, San Juan, and Navajo rivers and their tributaries at the lower elevations of the San Juan Public Lands under all alternatives. Specific projects with new road construction in the Dolores or Mancos river drainages, or within the McElmo Canyon watershed could likely result in moderately adverse effects to the flannelmouth sucker because of the salinity issues and higher sediment production from these sensitive watersheds. The effects to the flannelmouth sucker would be more adverse than to the roundtail chub or bluehead sucker because of its more tenuous situation. Again, since the exact details for these projects are unknown presently, the impacts continue to be speculative.

Reasonably foreseeable future oil and gas development is projected to impact watersheds east of Pagosa Springs (in the San Juan Sag area) predominately on national forest lands, and on the BLM portion (in the Disappointment Valley, Big Gypsum Valley, and Dry Creek Basin, and along the Dolores River Canyon) and on the national forest portion (in the Glade and McPhee Reservoir areas, and along the Dolores River Canyon) of the Paradox Basin. Within the Paradox Basin, there are two types of possible gas development (ie., conventional gas and Gothic Shale gas). In the San Juan Sag area, exploration could include one to two wildcat wells per year.

The Paradox Basin would develop as a field of 1,350 federal wellpads within an area of approximately 400,000 acres. The progression of development would involve an exploratory phase of approximately seven years followed by full field development in which over 100 wells are drilled per year. Paradox Basin gas development would result in direct impact of approximately 4,500 acres due to well and road construction. Approximately 40-percent of this development would be on existing leases and 60- percent on future leases. This level of disturbance would involve clearing of approximately one-percent of total land area where development is projected.

New gas development on 80-acre spacing units in the Northern San Juan Basin would result in 200 new or expanded federal well pads with a corresponding 300 acres of disturbance within a 125,000 acre area. All San Juan Basin development would be on existing leases and guided by best management practices.

Where oil and gas facilities are developed within the prospective areas, soil erosion and sediment deposition, and corresponding potential to impact aquatic and riparian habitat would be limited first by implementing the above lease requirements that require avoidance of sensitive, erosion prone areas and riparian areas, and secondly by the application of the design criteria listed above, that include, for example, graveling road surfaces to avoid dust and loss of soil to wind erosion; revegetating or covering any soil stockpiles that would remain for extended periods to avoid significant wind and water erosion; installing slope breaks and silt fences on slopes to slow and filter storm water runoff that might carry exposed soils to surface water drainages; timely reclamation of disturbed areas to minimize erosion after construction of facilities; and avoiding locations having highly erosive soils where possible. Non productive wells, referred to as dry-holes, would immediately be reclaimed.

Overall, the impacts to fisheries and aquatic species from oil and gas leasing and development within the San Juan Sag, the Paradox Basin, and the Northern San Juan would be mainly related to reduced stream-flows over time due the water used in the drilling and completion process and to the dewatering of gas-producing rock formations. This would, subsequently, reduce fishery habitat available for use, magnify any increased sediment effects, and result in degraded fishery habitat (as well as in the potential for contamination from petroleum products, drilling mud, and other contaminants).

During oil and gas development, water can be removed from the ecosystem by two ways. First, generally small amounts of water will be used during the drilling and completion process, except in the development of Gothic Shale gas which requires larger quantities of water. Typically, this water is hauled on-site by water trucks and removed as a waste sludge. This water usage occurs with all drilling operations. Water is also used in dust abatement to these well pads and during hydrostatic testing of pipelines. Second, water can be depleted during gas field production. Here, water is produced or pumped from the gas producing formations in order to release the pressure on the gas tied-up in the seam and allow it to flow. For coalbed methane gas wells for instance, this water is transported to a disposal well for re-injection into a formation several thousand feet lower than where it was removed. Because of the possible connectivity of this produced groundwater to surface water streams, gas production may affect stream-flow.

For conventional, coalbed methane, and Gothic Shale gas wells, approximately 1.4 acre-feet per well, 0.7 acre-feet per well, and 7.9 to 13.1 acre-feet per well of water, respectively, are anticipated to be used in the well drilling and completion process. The level of water used for Gothic Shale gas wells (GSGP) in the Paradox Basin is 6 to 11times the amount of water used to drill and complete a conventional gas well, and 11 to 18 times the amount of water used to drill and complete a coalbed methane gas well. It is assumed that all water associated with GSGP gas development and production would have to be purchased and trucked into the project area, as the water would not be obtained from water sources on public land. The sources of this private water are unknown, but would occur within the San Juan River Basin and Dolores River Basin. Since this water is connected to a Federal action, it is considered a depletion from a major river basin, and would require preparation of a biological assessment and coordination and consultation with the US Fish and Wildlife Service (FWS) for threatened and endangered species (TES), under Section 7 of the Endangered Species Act. Because of difficulties in quantifying effects on stream-flow, water depleted due to gas field production was not estimated.

For Alternative A, as an example, the two tables below describe the water used in the drilling and completion process. Table S-BE-3 displays the acre-feet of water used over 15 years for the future and existing leases on combined Forest Service and BLM public lands, and on non-Federal leases. Table S-BE-4 describes the average, annual acre-feet of water used by the Forest Service and BLM for the future leases during the exploratory and production phases by river basins.

**Table S-BE-11 - Water Used in Well Drilling and Completion (Acre-Feet) Over 15 Years for both Forest Service and BLM Public Lands**

| Projected Development Areas | Future Leases | Existing Leases | Non-Federal Leases | Total |
|---|---|---|---|---|
| **Paradox** | 5,657 | 3,275 | 6,572 | 15,504 |
| **Northern San Juan Basin** | 0 | 296 | 268 | 564 |
| **San Juan Sag** | 35 | 7 | 0 | 42 |
| **Total** | 5,692 | 3,578 | 6,840 | 16,110 |

**Table S-BE-12 – Average Annual Water Used in Well Drilling and Completion (Acre-Feet/Year) for Future Leases on Forest Service and BLM Public Lands by River Basins**

| | Years | Dolores River | San Juan River | Total |
|---|---|---|---|---|
| Forest Service | 1 to 7 | 62 | 4 | 66 |
| Forest Service | 8 to 12 | 364 | 21 | 385 |
| Forest Service | 13 to 15 | 534 | 30 | 564 |
| BLM | 1 to 7 | 23 | 5 | 28 |
| BLM | 8 to 12 | 117 | 29 | 146 |
| BLM | 13 to 15 | 182 | 46 | 228 |

The effects of oil and gas leasing and development, generally similar for all alternatives, could likely be moderately adverse to the flannelmouth sucker downstream from this activity found in the Dolores, Mancos, LaPlata, Animas, Florida, Los Pinos, Piedra, San Juan, and Navajo rivers or their tributaries, or in McElmo Canyon at the lower elevations of the San Juan Public Lands. The impacts are mainly due to water depletion and reduced stream flows over time and subsequently reduced fishery habitat available for use. Since the effects from oil and gas development are speculative, more precise effects cannot be determined until the location, timing, size, and exact design of the projects are known. There would be concerns for new oil and gas development in the Dolores or Mancos river watersheds, or within the McElmo Canyon watershed with salinity issues, high road densities, or sensitivity to disturbance (eg., degraded fishery habitat). If no new leases were made available, the impacts on the flannelmouth sucker would be as a result of existing lease only.

Mining activities on the San Juan Public Lands can include recreational gold panning and suction dredging, gravel mining operations, hard-rock mining, uranium and vanadium mining, etc. Chapter 2 displays the potential acreage of disturbance per year from these activities. The effects to fisheries and aquatic species from mining or mining reclamation are mainly from erosion and sediment impacts (eg., degraded fishery habitat), saline runoff or heavy metal loading of streams (eg., toxic levels for aquatic species), and altered stream channels and associated fishery habitat.

Generally, the effects of mining and mining reclamation, mostly similar under all alternatives, may adversely affect specific individuals but would overall be minor for the populations of flannelmouth sucker found in the LaPlata, Animas, Florida, Los Pinos, Piedra, San Juan, and Navajo rivers at the lower elevations of the San Juan Public Lands. Specific uranium and vanadium mining projects in the Dolores or Mancos river drainages, or within the McElmo Canyon watershed under all alternatives with salinity issues, high road densities, or sensitive to disturbance would likely result in moderately adverse effects to the flannelmouth sucker because of its more tenuous situation than the roundtail chub or bluehead sucker. Again, since the exact details for these projects are unknown presently, the impacts continue to be speculative.

Timber harvesting within Forest Service standards has little impact on stream habitats except for the roads and trails necessary to skid logs to landings and to haul logs to mills. Construction and use of the roads exposes soil and may accelerate erosion. If these areas of bare soil are connected to the stream network, sedimentation can occur. Connectivity of disturbed areas can be due to road crossings, rills, gullies, and poorly designed road drainage systems. Fine sediments in streams can reduce spawning habitat and limit macroinvertebrate populations. If sediment enters the stream during incubation, it can smother the eggs. Sediment can also deposit in pools and reduce pool depth and volume. Adult fish may move out of these pools to find more suitable areas.

The effects from vegetation management may adversely affect specific individuals but would overall be minor for the population of flannelmouth suckers. Since all alternatives have generally the same levels of timber harvest, hazardous fuels treatment, etc. (only 1800 acres separate Alternative D with the greatest levels of harvest and Alternative C with the least amount of vegetation treatment), the effects would be nearly the same for all alternatives. Again, the impacts are driven by sediment and stream temperature influences on fishery habitat quality.

In regard to air quality, the effects of oil and gas development and other management activities on the flannelmouth sucker would be negligible over the life of the Management Plan. The Air Analysis was focused on the entire Unit, not just the Gothic Shale area in the Paradox Basin. It is a modeling effort with many assumptions, including a gas development scenario as depicted in the Reasonably Foreseeable Development (RFD). The potential impacts of nitrogen loading or sulfur dioxide deposition to lakes, streams, and the aquatic ecosystems and fish species would be a very slow and prolonged process. It would probably be very difficult to detect any measureable effects on aquatic ecosystems well beyond the life of the Management Plan.

**Cumulative Impacts:** Flannelmouth suckers are Forest Service and BLM sensitive species as a result of past cumulative effects, locally and regionally. For all alternatives, the primary adverse cumulative effects on this warm water species, found in the Dolores, Mancos, LaPlata, Animas, Florida, Los Pinos, Piedra, San Juan, and Navajo rivers and their tributaries, or in McElmo Canyon at the lower elevations of the San Juan Public Lands, presently, would occur from activities that lead to additional water depletions and reduced stream flows (ie., reduced or eliminated fishery habitat that is available for use). Again, these activities would mainly be water use and development projects on or off the San Juan Public Lands, or oil and gas development from current leases and projected new leases on or off the San Juan Public Lands. The demands for water use and development projects are difficult to analysis because they are driven by proponents rather than by San Juan Public Land's programs or budgets. Because of heightened concerns about sediment and salinity inputs and downstream effects on fishery habitat quality, ground-disturbing activities (new road construction, uranium and vanadium mining, etc) in the Dolores or Mancos rivers watershed or within the McElmo Canyon watershed may also adversely affect the flannelmouth sucker. However, since the exact details for these projects and activities in the Dolores or Mancos river watersheds, or within the McElmo Canyon watershed are unknown presently, the impacts continue to be speculative.

Water depletions from the oil and gas leasing and development on the San Juan Public Lands would be moderately adverse to the flannelmouth sucker immediately downstream. These water depletions would result either from the generally small amounts of water used during the drilling and completion process for each individual well (except in the development of Gothic Shale gas which requires larger quantities of water) and/or from possible dewatering of the gas producing formations during gas field production. For all the future leases on both Forest Service and BLM public lands, about 85 acre-feet per year and 9 acre-feet per year would be used in the drilling and completion process in the Dolores and San Juan river basins, respectively, for the first seven years (predominately the exploratory phase). The first development phase (years 8 through 12) would require 481 and 50 acre-feet per year of water for the drilling and completion process in the Dolores and San Juan river basins, respectively. The major production phase (years 13 through 15) would require 716 and 76 acre-feet per year of water in the Dolores and San Juan river basins, respectively.

These water depletions are small relative to the total, historic depletions within these river basins. For instance, as of December 31, 2002, the US Fish and Wildlife Service recognized that there was 846,192 acre-feet per year of water depletions from federal actions within the San Juan River Basin. Of this, 241,814 acre-feet per year were associated with federal actions in Colorado (USFWS 2003). Depletions associated with non-federal actions (private or State activities) increase these values considerably.

It is likely there will be cumulative effects from as many as 2,500 new gas wells drilled on or adjacent to the San Juan Public Lands over the next planning period. In addition to an estimated 800 new wells that may be drilled on new leases (discussed under Direct and Indirect Impacts), there could be as many as 200 new and infill gas wells drilled in the northern San Juan Basin, 1000 new wells drilled on the Southern Ute Tribal lands adjacent to the Unit, and 1300 new wells on previously leased land in the Paradox Basin. The Reasonable and Foreseeable Development projected wells would require new roads, pipelines and associated disturbance for gas well construction. Consequently, oil and gas development may have large potential to have substantial cumulative effects when compared to all other activities that affect the San Juan Public Lands. The magnitude of new road/pipeline construction and other disturbances would vary only slightly by alternative.

Although not attributed to management activities on the San Juan Public Lands, the urbanization or development of intermixed private lands within or immediately adjacent to the Unit would have potential effects. Continued development of these lands for residential purposes has the potential at affect fisheries and aquatic resources. Increased runoff and sedimentation from paved and unpaved roads, roofs, and driveways, increased use of surface and groundwater, increased use of herbicides, pesticides, and fertilizers, and increased recreation uses on adjacent public lands can all be attributed to urbanization. If activities on intermixed private lands approach tolerance limits for watershed disturbance, additional activities on the Unit may be limited or curtailed to avoid adverse and cumulative effects to watersheds and aquatic ecosystems. With the amount of intermixed ownership within or immediately adjacent to the Unit, this effect could be moderate at the lower elevations of the public lands.

**Effects Determination:**Water depletions caused by oil and gas leasing and development on the San Juan Public Lands are relatively small compared to the total, historic depletions within these river basins. Since water use and development projects are proponent driven, the effects these projects would have on the flannelmouth sucker are speculative but likely adverse immediately downstream of these activities. Although the flannelmouth sucker distribution and abundance have diminished, they still occupy a wide geographic area and range of locations. Through the Desired Conditions, Objectives, Design Criteria, and Guidelines, effects to the flannelmouth sucker would be minimized. Therefore, management activities in all alternatives associated with the Forest Plan/RMP Revision **MAY ADVERSELY IMPACT INDIVIDUALS, BUT NOT LIKELY RESULTS IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE**. However, it should be recognized that these water depletions from the

Unit would contribute to the overall cumulative effects of water depletion within the San Juan and Dolores river basins. Some years into the future, the cumulative effects of water depletions within these basins could have the potential to comprise population viability within the planning unit and could possibly increase the probability of federal listing of the flannelmouth sucker.

## Bluehead Sucker *(Catostomus discobolus)*

**Distribution:**The bluehead sucker is native to the Colorado River Basin and ancient Lake Bonneville in Idaho, Utah, and Wyoming (Ptacek, Rees, and Miller 2005). Historically, bluehead suckers occurred in streams and rivers in the Colorado River Basin (Joseph et al 1977, Bezzerides and Bestgen 2002) as well as in the drainages of the upper Snake, Weber, and Bear rivers (Sigler and Miller 1963, Sublette et al 1990). Within the Colorado River Basin, bluehead suckers are presently found in the Colorado, Dolores, Duchesne, Escalante, Fremont, Green, Gunnison, Price, San Juan, San Rafael, White, and Yampa rivers and numerous smaller tributaries (Vanicek et al 1970, Bezzerides and Bestgen 2002).

Bluehead sucker populations are known to exist in several tributary streams immediately downstream of lands managed by the San Juan Public Lands. Miller and Rees (2000) indicated that the bluehead sucker was among the most common fish species collected in tributaries on the San Juan River. While most of these tributaries originate on the San Juan Public Lands, their study area did not extend onto BLM and NFS lands. These tributary streams include Florida River, La Plata River, and Los Pinos River. The bluehead sucker is known to occur on San Juan Public Lands of the upper San Juan River, Piedra River, Animas River, and the Dolores River (Mike Japhet, CDOW, 2006, pers. com.).

**Reason for Concern:**Recent work suggests that bluehead sucker populations are decling throughout their historic range (Wheeler 1997, Bezzerides and Bestgen 2002, Weitzel 2002). Currently, they are found in only 45 percent of their historic range in the Upper Colorado River Basin (Bezzerides and Bestgen 2002). The reasons for this decline are mostly due to water diversion and alteration of streamflow regimes in mainstem rivers and tributary streams, changes in water temperature regimes of these streams, degradation of habitat, and interactions with non-native species (Ptacek, Rees, and Miller 2005). Dams, impoundments, and water use practices (eg., diversion ditches) are probably the major reasons for modified natural river flows and channel characteristics in the both mainstem rivers and tributary streams. Dams on the mainstem rivers have segmented the river system, blocking spawning migrations, and changing flows and temperatures (eg., conversion of warm water habitat to cold water habitat). Other water use and development projects have reduced or eliminated suitable habitat due to water depletions and reduced stream flows. Major changes in species composition have occurred with the introduction of non-native species. The decline of bluehead sucker seems related to predation, competition, or other behavioral interactions with non-native fishes. Alterations in the natural fluvial environment from land management activity has exacerbated this problem (USFWS 1995).

Historically, the bluehead, flannelmouth, and razorback suckers comprised the medium to large size Catostomid population in the Upper Colorado River Basin. Again, distribution and abundance of bluehead suckers have diminished (Bezzerides and Bestgen 2002). The introduced white sucker and channel catfish have diets that partially overlap with bluehead sucker and are thus competitors for food resources. In addition to competing with bluehead suckers, several non-native and native fishes prey on bluehead suckers (Brooks et al 2000, Ruppert et al 1993).

**Life History:**Although this species sometimes occupies areas of suitable habitat in larger, low elevation, mainstem streams, it is most commonly collected in small or mid-sized tributaries of the Upper Colorado River Basin (Ptacek, Rees, and Miller 2005). Most reaches of this system receive heavy sediment loads and high annual peak flows that contrast with low base flows. Little is known about the specific influence of these annual events, but healthy bluehead sucker populations have persisted in habitats with a wide range of annual flows, sediment transport, and even sediment deposition, providing that these physical events are associated with a natural flow regime (Ptacek, Rees, and Miller 2005).

Adult bluehead suckers exhibit a strong preference for specific habitat types (Holden and Stalnaker 1975). In-stream distribution is often related to the prescence of rocky substrate which they prefer (Holden 1973). This species has been reported to typically be found in runs or riffles with rock or gravel substrate (Vanicek 1967, Holden and Stalnaker 1975, Carlson et al 1979, Sublette et al 1990). Junveniles have been collected from shallow riffles, backwaters, and eddies with silt or gravel substrate (Vanicek 1967).

Although the species generally inhabits streams with cool temperatures, bluehead suckers have been found inhabiting small creeks with water temperatures as high as 28oC (Smith 1966). This species is found in a large variety of river systems ranging from large rivers with discharges of several hundred cubic meters per second to small creeks with less than 0.05 cubic meters per second (Smith 1966).

Bluehead suckers spawn in the spring and early summer. Holden (1973) and Andreasen and Barnes (1975) reported spawning activity occurring during June and July in the Upper Colorado River Basin. All ripe fish that were collected by Vanicek (1967) during spawning occurred in pools or slow runs associated with large cobbles or boulders. Spawning occurred when water temperatures ranged from 18.2 to 24.6oC (Maddux and Kepner 1988).

Hybridization between bluehead suckers and other sucker species occurs throughout the range of this species. Bluehead suckers are known to hybridize with the native flannelmouth sucker and mountain sucker, as well as the non-native white sucker (Bezzerides and Bestgen 2002). In natural or minimally altered systems, certain undefined mechanisms (eg., depth and velocity requirements, habitat selection, spawning timing) likely isolate spawning individuals of bluehead sucker and flannelmouth sucker; however, hybrids of these two species do occur (Hubbs and Hubbs 1947, Hubbs and Miller 1953, Whiteman 2000). The most common instance of hybridization, and perhaps the most detrimental, occurs with the non-native white sucker.

Very little information is available on the influence of turbidity on the sensitive Colorado River fishes. It is assumed that turbidity is important particularly as it affects the interaction between introduced fishes and the endemic Colorado River fishes. Because these endemic fishes have evolved under natural conditions of high turbidity, it is probable high turbidity is important. Reduction of turbidity may enable introduced species to gain a competitive edge which could further contribute to the decline of bluehead sucker (USFWS 1995).

**Effects Analysis**

**Direct and Indirect Impacts For All Alternatives:** The anticipated levels of land management activities that are associated with each alternative are displayed in Chapter 2 of this EIS.

Except for some general area descriptions for oil and gas leasing and development (eg., San Juan Sag east of Pagosa Springs and Paradox Basin in the Glade, Disappointment Valley, and Dolores River Canyon areas on the western side of the Unit), uranium and vanadium exploration and development (western Dolores Ranger District/Field Office), and a few other activities, specific locations and details for many management actions are unknown. Although most historic management activities (eg., livestock grazing, etc) will continue to occur in the general vicinity that they are now occurring, precise effects cannot be determined until the location, timing, size, and exact design of the projects are known. As a result, these effects on sensitive fish species are discussed in general terms.

Areas on the Unit with salinity issues, high road densities, and/or sensitive to disturbance (eg., Dolores River watershed) are identified in Chapter 3.3 (“Water” Section) of this EIS. This information is factored into the effects analysis that follows.

Desired Conditions, Objectives, Design Criteria, and Guidelines from the accompanying Forest Plan/RMP Revision that pertain to each sensitive fish species are identified in Appendix M, Table M.2 of this EIS. These Revision components apply to all alternatives and help minimize impacts on aquatic species. They also include Forest Service and BLM manuals and handbooks, such as the Forest Service's Watershed Conservation Practices Handbook and BLM's Surface Operating Standards and Guidelines for Oil and gas Exploration and Development, which prescribe extensive measures that apply to certain management activities that protect soil, riparian, and aquatic resources. In addition, lease stipulations on new oil and gas leases are listed in Appendix H of this EIS and help protect and minimize effects to aquatic resources.

As previously stated, water diversions and depletions have had the greatest effect on bluehead suckers and other warm water sensitive fish species. Water diversions and depletions occur as a result of municipal and domestic uses, water storage, irrigation, stock ponds, transbasin diversions, snowmaking, and numerous other reasons. The effects from water use and development projects (including diversion ditches, storage reservoirs, pipelines, wells, etc) are reduced or eliminated stream flows and reduced or eliminated fishery habitat that is not available for use. Water depletions reduce peak flow and durations. This causes losses of backwater pools for spawning and rearing. It also reduces suspended sediments which may confer a competitive advantage on non-native species. Additional impacts include increased stream temperatures and reduced dissolved oxygen levels. These effects could be more pronounced during periods of natural cyclic flow reductions (in fall and winter) or during summer months in a drought.

The effects from water use and development projects would likely be moderately adverse to bluehead suckers immediately downstream from these projects found in the Dolores, LaPlata, Animas, Florida, Los Pinos, Piedra, and San Juan rivers or their major tributaries at the lower elevations of the San Juan Public Lands under all alternatives. The impacts of reduced or eliminated fishery habitat would result from water depletions and reduced stream flows. The impacts are not expected to vary between alternatives since the demand for water use authorizations are driven by proponents rather than by San Juan Public Land's programs or budgets. Because the effects of water use and development projects are speculative, more precise effects cannot be determined until the location, timing, size, and exact design of the projects are known.

Livestock grazing can degrade in-stream habitat and water quality. Effects generally are increased sedimentation, increased stream temperatures, and fecal/bacteria contamination. The effects from livestock grazing and big game use under all alternatives may adversely affect specific individuals but would overall be minor for the populations of the blueheader sucker. Because of the lag time to influence existing conditions, Alternative C with its reductions in suitable and available livestock grazing areas may reduce grazing effects on fisheries from the present conditions in the long-term, but not in the short-term. For Alternative D with its increases in suitable and available livestock grazing areas, grazing may increase effects on these fisheries from the present in the long-term, but not in the short-term. Although there will be localized improvements in grazing management and implementation of rangeland health improvement projects, the impacts of sediment and increased water temperatures on fishery habitat quality should continue.

The effects of roads are primarily through sediment production. Eroded material may be delivered to streams as fine sediment and deposited in channels or transported downstream. The actual amount of sediment from these land disturbing activities that reaches stream channels or still water bodies would be a result of numerous factors including the location of roads, number of road/stream crossings, slope steepness and length, amount of exposed soil, type of vegetation in the area, frequency and intensity of rainfall, soil type and the implementation and effectiveness of BMPs. Heavy sediment loads can reduce pool depths, bury stream substrates and spawning gravels, adhere to aquatic insects and the gills of fish, alter channel form and function, and result in other forms of habitat degradation. Improperly placed, shaped, and sized culverts can act as fish barriers on key streams or exacerbate erosion and cause head-cutting. Elevated salinity levels, over extended periods of time, may become toxic for aquatic ecosystems and fish species.

Generally, the effects from roads may adversely affect specific individuals but overall would be minor for the populations of bluehead suckers found in the LaPlata, Animas, Florida, Los Pinos, Piedra, and San Juan rivers and their tributaries at the lower elevations of the San Juan Public Lands under all alternatives. Specific projects with new road construction in the Dolores River drainage could likely result in moderately adverse effects to the bluehead sucker because of the salinity issues and higher sediment production from these sensitive watersheds. Again, since the exact details for these projects are unknown presently, the impacts continue to be speculative.

Reasonably foreseeable future oil and gas development is projected to impact watersheds east of Pagosa Springs (in the San Juan Sag area) predominately on national forest lands, and on the BLM portion (in the Disappointment Valley, Big Gypsum Valley, and Dry Creek Basin, and along the Dolores River Canyon) and on the national forest portion (in the Glade and McPhee Reservoir areas, and along the Dolores River Canyon) of the Paradox Basin. Within the Paradox Basin, there are two types of possible gas development (ie., conventional gas and Gothic Shale gas). In the San Juan Sag area, exploration could include one to two wildcat wells per year.

The Paradox Basin would develop as a field of 1,350 federal wellpads within an area of approximately 400,000 acres. The progression of development would involve an exploratory phase of approximately seven years followed by full field development in which over 100 wells are drilled per year. Paradox Basin gas development would result in direct impact of approximately 4,500 acres due to well and road construction. Approximately 40-percent of this development would be on existing leases and 60- percent on future leases. This level of disturbance would involve clearing of approximately one-percent of total land area where development is projected.

New gas development on 80-acre spacing units in the Northern San Juan Basin would result in 200 new or expanded federal well pads with a corresponding 300 acres of disturbance within a 125,000 acre area. All San Juan Basin development would be on existing leases and guided by best management practices.

Where oil and gas facilities are developed within the prospective areas, soil erosion and sediment deposition, and corresponding potential to impact aquatic and riparian habitat would be limited first by implementing the above lease requirements that require avoidance of sensitive, erosion prone areas and riparian areas, and secondly by the application of the design criteria listed above, that include, for example, graveling road surfaces to avoid dust and loss of soil to wind erosion; revegetating or covering any soil stockpiles that would remain for extended periods to avoid significant wind and water erosion; installing slope breaks and silt fences on slopes to slow and filter storm water runoff that might carry exposed soils to surface water drainages; timely reclamation of disturbed areas to minimize erosion after construction of facilities; and avoiding locations having highly erosive soils where possible. Non productive wells, referred to as dry-holes, would immediately be reclaimed.

Overall, the impacts to fisheries and aquatic species from oil and gas leasing and development within the San Juan Sag, the Paradox Basin, and the Northern San Juan would be mainly related to reduced stream-flows over time due the water used in the drilling and completion process and to the dewatering of gas-producing rock formations. This would, subsequently, reduce fishery habitat available for use, magnify any increased sediment effects, and result in degraded fishery habitat (as well as in the potential for contamination from petroleum products, drilling mud, and other contaminants).

During oil and gas development, water can be removed from the ecosystem by two ways. First, generally small amounts of water will be used during the drilling and completion process, except in the development of Gothic Shale gas which requires larger quantities of water. Typically, this water is hauled on-site by water trucks and removed as a waste sludge. This water usage occurs with all drilling operations. Water is also used in dust abatement to these well pads and during hydrostatic testing of pipelines. Second, water can be depleted during gas field production. Here, water is produced or pumped from the gas producing formations in order to release the pressure on the gas tied-up in the seam and allow it to flow. For coalbed methane gas wells for instance, this water is transported to a disposal well for re-injection into a formation several thousand feet lower than where it was removed. Because of the possible connectivity of this produced groundwater to surface water streams, gas production may affect stream-flow.

For conventional, coalbed methane, and Gothic Shale gas wells, approximately 1.4 acre-feet per well, 0.7 acre-feet per well, and 7.9 to 13.1 acre-feet per well of water, respectively, are anticipated to be used in the well drilling and completion process. The level of water used for Gothic Shale gas wells (GSGP) in the Paradox Basin is 6 to 11times the amount of water used to drill and complete a conventional gas well, and 11 to 18 times the amount of water used to drill and complete a coalbed methane gas well. It is assumed that all water associated with GSGP gas development and production would have to be purchased and trucked into the project area, as the water would not be obtained from water sources on public land. The sources of this private water are unknown, but would occur within the San Juan River Basin and Dolores River Basin. Since this water is connected to a Federal action, it is considered a depletion from a major river basin, and would require preparation of a biological assessment and coordination and consultation with the US Fish and Wildlife Service (FWS) for threatened and endangered species (TES), under Section 7 of the Endangered Species Act. Because of difficulties in quantifying effects on stream-flow, water depleted due to gas field production was not estimated.

For Alternative A, as an example, the two tables below describe the water used in the drilling and completion process. Table S-BE-3 displays the acre-feet of water used over 15 years for the future and existing leases on combined Forest Service and BLM public lands, and on non-Federal leases. Table S-BE-4 describes the average, annual acre-feet of water used by the Forest Service and BLM for the future leases during the exploratory and production phases by river basins.

**Table S-BE-13 - Water Used in Well Drilling and Completion (Acre-Feet) Over 15 Years for both Forest Service and BLM Public Lands**

| Projected Development Areas | Future Leases | Existing Leases | Non-Federal Leases | Total |
|---|---|---|---|---|
| **Paradox** | 5,657 | 3,275 | 6,572 | 15,504 |
| **Northern San Juan Basin** | 0 | 296 | 268 | 564 |
| **San Juan Sag** | 35 | 7 | 0 | 42 |
| **Total** | 5,692 | 3,578 | 6,840 | 16,110 |

**Table S-BE-14 – Average Annual Water Used in Well Drilling and Completion (Acre-Feet/Year) for Future Leases on Forest Service and BLM Public Lands by River Basins**

| | Years | Dolores River | San Juan River | Total |
|---|---|---|---|---|
| Forest Service | 1 to 7 | 62 | 4 | 66 |
| Forest Service | 8 to 12 | 364 | 21 | 385 |
| Forest Service | 13 to 15 | 534 | 30 | 564 |
| BLM | 1 to 7 | 23 | 5 | 28 |
| BLM | 8 to 12 | 117 | 29 | 146 |
| BLM | 13 to 15 | 182 | 46 | 228 |

The effects of oil and gas leasing and development, generally similar for all alternatives, could likely be moderately adverse to the bluehead sucker downstream from this activity found in the Dolores, LaPlata, Animas, Florida, Los Pinos, Piedra, and San Juan rivers or their tributaries at the lower elevations of the San Juan Public Lands. The impacts are mainly due to water depletion and reduced stream flows over time and subsequently reduced fishery habitat available for use. Since the effects from oil and gas development are speculative, more precise effects cannot be determined until the location, timing, size, and exact design of the projects are known. There would be concerns for new oil and gas development in the Dolores River watershed with salinity issues, high road densities, or sensitivity to disturbance (eg., degraded fishery habitat). If no new leases were made available, the impacts on the bluehead sucker would be as a result of existing leases only.

Mining activities on the San Juan Public Lands can include recreational gold panning and suction dredging, gravel mining operations, hard-rock mining, uranium and vanadium mining, etc. Chapter 2 displays the potential acreage of disturbance per year from these activities. The effects to fisheries and aquatic species from mining or mining reclamation are mainly from erosion and sediment impacts (eg., degraded fishery habitat), saline runoff or heavy metal loading of streams (eg., toxic levels for aquatic species), and altered stream channels and associated fishery habitat.

Generally, the effects of mining and mining reclamation, mostly similar under all alternatives, may adversely affect specific individuals but would overall be minor for the populations of bluehead sucker found in the LaPlata, Animas, Florida, Los Pinos, Piedra, and San Juan rivers at the lower elevations of the San Juan Public Lands. Specific uranium and vanadium mining projects in the Dolores River drainage under all alternatives with salinity issues, high road densities, or sensitive to disturbance would likely result in minor adverse effects to the bluehead sucker because of populations in other unaffected drainages. Again, since the exact details for these projects are unknown presently, the impacts continue to be speculative.

Timber harvesting within Forest Service standards has little impact on stream habitats except for the roads and trails necessary to skid logs to landings and to haul logs to mills. Construction and use of the roads exposes soil and may accelerate erosion. If these areas of bare soil are connected to the stream network, sedimentation can occur. Connectivity of disturbed areas can be due to road crossings, rills, gullies, and poorly designed road drainage systems. Fine sediments in streams can reduce spawning habitat and limit macroinvertebrate populations. If sediment enters the stream during incubation, it can smother the eggs. Sediment can also deposit in pools and reduce pool depth and volume. Adult fish may move out of these pools to find more suitable areas.

The effects from vegetation management may adversely affect specific individuals but would overall be minor for the population of bluehead suckers. Since all alternatives have generally the same levels of timber harvest, hazardous fuels treatment, etc. (only 1800 acres separate Alternative

D with the greatest levels of harvest and Alternative C with the least amount of vegetation treatment), the effects would be nearly the same for all alternatives. Again, the impacts are driven by sediment and stream temperature influences on fishery habitat quality.

In regard to air quality, the effects of oil and gas development and other management activities on the bluehead sucker would be negligible over the life of the Management Plan. The Air Analysis was focused on the entire Unit, not just the Gothic Shale area in the Paradox Basin. It is a modeling effort with many assumptions, including a gas development scenario as depicted in the Reasonably Foreseeable Development (RFD). The potential impacts of nitrogen loading or sulfur dioxide deposition to lakes, streams, and the aquatic ecosystems and fish species would be a very slow and prolonged process. It would probably be very difficult to detect any measureable effects on aquatic ecosystems well beyond the life of the Management Plan.

**Cumulative Impacts:** Bluehead suckers are Forest Service and BLM sensitive species as a result of past cumulative effects, locally and regionally. For all alternatives, the primary adverse cumulative effects on this warm water species, found in the Dolores, LaPlata, Animas, Florida, Los Pinos, Piedra, and San Juan rivers and their tributaries at the lower elevations of the San Juan Public Lands, presently, would occur from activities that lead to additional water depletions and reduced stream flows (ie., reduced or eliminated fishery habitat that is available for use). Again, these activities would mainly be water use and development projects on or off the San Juan Public Lands, or oil and gas development from current leases and projected new leases on or off the San Juan Public Lands. The demands for water use and development projects are difficult to analysis because they are driven by proponents rather than by San Juan Public Land's programs or budgets. Because of heightened concerns about sediment and salinity inputs and downstream effects on fishery habitat quality, ground-disturbing activities (new road construction, uranium and vanadium mining, etc) in the Dolores River watershed may also adversely affect the bluehead sucker. However, since the exact details for these projects and activities in the Dolores River watershed are unknown presently, the impacts continue to be speculative.

Water depletions from the oil and gas leasing and development on the San Juan Public Lands would be moderately adverse to the bluehead sucker immediately downstream. These water depletions would result either from the generally small amounts of water used during the drilling and completion process for each individual well (except in the development of Gothic Shale gas which requires larger quantities of water) and/or from possible dewatering of the gas producing formations during gas field production. For all the future leases on both Forest Service and BLM public lands, about 85 acre-feet per year and 9 acre-feet per year would be used in the drilling and completion process in the Dolores and San Juan river basins, respectively, for the first seven years (predominately the exploratory phase). The first development phase (years 8 through 12) would require 481 and 50 acre-feet per year of water for the drilling and completion process in the Dolores and San Juan river basins, respectively. The major production phase (years 13 through 15) would require 716 and 76 acre-feet per year of water in the Dolores and San Juan river basins, respectively.

These water depletions are small relative to the total, historic depletions within these river basins. For instance, as of December 31, 2002, the US Fish and Wildlife Service recognized that there was 846,192 acre-feet per year of water depletions from federal actions within the San Juan River Basin. Of this, 241,814 acre-feet per year were associated with federal actions in Colorado (USFWS 2003). Depletions associated with non-federal actions (private or State activities) increase these values considerably.

It is likely there will be cumulative effects from as many as 2,500 new gas wells drilled on or adjacent to the San Juan Public Lands over the next planning period. In addition to an estimated

800new wells that may be drilled on new leases (discussed under Direct and Indirect Impacts), there could be as many as 200 new and infill gas wells drilled in the northern San Juan Basin, 1000 new wells drilled on the Southern Ute Tribal lands adjacent to the Unit, and 1300 new wells on previously leased land in the Paradox Basin. The Reasonable and Foreseeable Development projected wells would require new roads, pipelines and associated disturbance for gas well construction. Consequently, oil and gas development may have large potential to have substantial cumulative effects when compared to all other activities that affect the San Juan Public Lands. The magnitude of new road/pipeline construction and other disturbances would vary only slightly by alternative.

Although not attributed to management activities on the San Juan Public Lands, the urbanization or development of intermixed private lands within or immediately adjacent to the Unit would have potential effects. Continued development of these lands for residential purposes has the potential at affect fisheries and aquatic resources. Increased runoff and sedimentation from paved and unpaved roads, roofs, and driveways, increased use of surface and groundwater, increased use of herbicides, pesticides, and fertilizers, and increased recreation uses on adjacent public lands can all be attributed to urbanization. If activities on intermixed private lands approach tolerance limits for watershed disturbance, additional activities on the Unit may be limited or curtailed to avoid adverse and cumulative effects to watersheds and aquatic ecosystems. With the amount of intermixed ownership within or immediately adjacent to the Unit, this effect could be moderate at the lower elevations of the public lands.

**Effects Determination:** Water depletions caused by oil and gas leasing and development on the San Juan Public Lands are relatively small compared to the total, historic depletions within these river basins. Since water use and development projects are proponent driven, the effects these projects would have on the bluehead sucker are speculative but likely adverse immediately downstream of these activities. Although the bluehead sucker distribution and abundance have diminished, they still occupy a wide geographic area and range of locations. Through the Desired Conditions, objectives, design criteria, and guidelines, effects to the bluehead sucker would be minimized. Therefore, management activities in all alternatives associated with the Forest Plan/RMP Revision**MAY ADVERSELY IMPACT INDIVIDUALS, BUT NOT LIKELY RESULTS IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.** However, it should be recognized that these water depletions from the unit would contribute to the overall cumulative effects of water depletion within the san juan and dolores river basins. Some years into the future, the cumulative effects of water depletions within these basins could have the potential to comprise population viability within the planning unit and could possibly increase the probability of federal listing of the bluehead sucker.

## Colorado River Cutthroat Trout *(Oncorhynchus clarki pleuriticus)*

**Distribution:** The Colorado River cutthroat trout is the only salmonid species native to western Colorado. The Colorado River cutthroat trout historically occupied portions of the Colorado River drainage in Wyoming, Colorado, Utah, Arizona, and New Mexico (Behnke 1992). Its original distribution probably included portions of larger streams, such as the Green (Simon 1935), Yampa, White, Colorado, and San Juan Rivers. Behnke and Zarn (1976) suggested this subspecies was absent from the lower reaches of many large rivers because of summer thermal barriers. Portions of the lower reaches may have been used in winter (Young 1995).

Now remaining populations occur mostly in headwater streams and lakes, and in several isolated headwater tributaries of the San Juan River. In southwest Colorado, conservation populations (i.e., a reproducing and recurring population that is managed to preserve the historical genome and/or unique genetic, ecological, and/or behavioral characteristics within specific populations and within geographic units) of the Colorado River cutthroat trout can be found in the Dolores River System (Deep Creek, Elk Creek, Rio Lado Creek, and Little Taylor Creek) and the San Juan River System (Augustora Creek, Beaver Creek, Big Bend Creek, Clear Creek, Headache Creek, East Fork Hermosa Creek, Himes Creek, Upper Navajo River, East Fork Piedra River, Shaw Creek, Terminal Reservoir, and West Virginia Gulch Creek) (CRCT Task Force 2001). Most of these creeks and rivers are located on the San Juan Public Lands. Several tributaries in the Hermosa drainage of the San Juan National Forest are managed as a metapopulation for Colorado River cutthroat trout—a collection of localized populations that are geographically distinct, yet are genetically interconnected through natural movement of individual fish between populations (Dave Gerhardt, 2006, pers com).

**Reason For Concern:** The abundance and distribution of Colorado River cuthroat trout have declined so much over the past 100 years that calls have been made for federal listing (Behnke and Zarn 1976; Young 1995). Colorado River cuthroat trout now occupy less than 1% of their historic range (Behnke 1979). In 2001, the Colorado River Cutthroat Trout Conservation Agreement and Strategy was established for the states of Colorado, Utah, and Wyoming to help State and Federal Agencies and Indian Tribes to work collaboratively and cooperatively to implement conservation measures to maintain and increase the species, and to avoid listing as a threatened or endangered species under the Endangered Species Act (CRCT Task Force 2001). Efforts have been underway for a number of years to reverse the declines in Colorado River cutthroat trout populations and reclaim pieces of its historic habitat so that the range of occupied cutthroat habitat is increased. However, the declines over time have been so severe that this subspecies of cutthroat has recently been petitioned for federal listing. The US Fish and Wildlife Service decided against listing because of no evidence of major declines in the overall distribution or abundance over the last several decades (Durango Herald, June 2007).

Introductions of non-native salmonids have had the greatest affect on Colorado River cutthroat trout (Young 1995). Stocking of non-natives began before 1900 and has been very widespread. Interactions with other species impact Colorado River cutthroat trout differently. Brook trout dislodge most subspecies of inland cutthroat when in sympatry, especially at lower elevations (Fausch 1989). The mechanism favoring brook trout is poorly understood, however it is clear higher water temperatures favor brook trout (DeStaso and Rahel 1994). Rainbow trout and other cutthroat subspecies readily hybridize with Colorado River cutthroat trout and produce fertile offspring. More populations of Colorado River cutthroat trout have probably been lost through hybridization than through any other means (Behnke and Zarn 1976).

A wide variety of land management practices have been suggested to affect populations of Colorado River cutthroat trout. These include livestock grazing, mining activities, road construction, and water diversions (Binns 1977, Jespersen 1981). Although the primary risk factors for this species are biological (non-native species and to some degree disease), roads can further affect Colorado River cutthroat trout populations through creation of barriers to fish movement, degradation of habitat by constraining streams and eliminating riparian vegetation, introduction of sediment, and the provision of access to anglers. Diversions and other water use practices have reduced or eliminated suitable habitat, fragmented streams, and restricted movement between formerly connected Colorado River cutthroat trout populations and created small, isolated populations. Although this subspecies has been regarded as the "canary in the mine" with regard to habitat degradation (Behnke and Benson 1980), it has also persevered in sub-optimal habitats (Binns 1977).

**Life History:** The diversity of Colorado River cutthroat trout life histories is probably reduced from historic levels (Young 1995). Adfluvial stocks were once common, but have largely been eliminated. Most remaining stocks are fluvial or resident.

Spawning by this subspecies begins after flows have peaked in spring or early summer and ends before runoff subsides (Quinlan 1980; Young 1995). Water temperature may be a cue for spawning. Colorado River cutthroat trout typically spawn in gravel substrate, mean particle size from 3.7 to 30 mm (Young 1995). The best survival rates are found in substrates with mean particle sizes from 13.8 to 15.9 mm or larger (Young et al. 1991). Redds tend to be located where velocity, depth, and bottom configuration induce water flow through the stream substrate (Young 1989). Redds are generally located where the water is between 11 and 18 cm deep and nose velocity is 15 to 35 cm per second (Young 1995).

Emergence generally occurs in late summer depending on elevation and annual climatic variation. Fry summer microhabitats are usually deeper than 3 cm and water velocity is slower than 6 cm per second (Bozek and Rahel 1991). Woody debris, boulders and rootwads shelter these sites from higher flows.

Colorado River cutthroat trout reach maturity at age 3 and rarely live past age 6 (Young 1995). Growth rates are among the lowest of all salmonids, probably due to the short growing seasons and colder temperatures at the higher elevations to which Colorado River cutthroat trout are currently confined. Lakes and streams with beaver ponds tend to have higher growth rates.

Some studies have shown spawning habitat, riffle water velocity, and cover to be the most important factors in determining trout biomass, with spawning habitat being the most significant (Jesperson 1981). Herger (1993) found most larger cutthroat trout in pools, and that trout density increased with pool depth. Young (1995) found coarse woody debris to be an important factor in determining Colorado River cutthroat trout biomass. He also noted meander habitats were underused, and occupied sites were deeper than average with slower water velocities.

Cutthroat trout, in some streams, do migrate (Jespersen 1981). Adults often move upstream to spawn and then downstream to deeper waters following spawning (Young 1995). Lake populations move in and out of tributaries. It is common to find smaller cutthroat upstream and the larger fish downstream (Jespersen 1981). Cutthroat may move from tributaries to larger river systems to overwinter.

The influence of predatory species on Colorado River cutthroat trout is not known, but dippers, mink, and other predatory birds and mammals do feed on them (Young 1995). The daytime positions of cutthroats are not associated with banks or overhead cover, and they may face a greater risk of predation to focus on daytime foraging.

**Effects Analysis**

**Direct and Indirect Impacts For All Alternatives:** The anticipated levels of land management activities that are associated with each alternative are displayed in Chapter 2 of this EIS.

Except for some general area descriptions for oil and gas leasing and development (eg., San Juan Sag east of Pagosa Springs and Paradox Basin in the Glade, Disappointment Valley, and Dolores River Canyon areas on the western side of the Unit), uranium and vanadium exploration and development (western Dolores Ranger District/Field Office), and a few other activities, specific locations and details for many management actions are unknown. Although most historic management activities (eg., livestock grazing, etc) will continue to occur in the general vicinity that they are now occurring, precise effects cannot be determined until the location, timing, size, and exact design of the projects are known. As a result, these effects on sensitive fish species are discussed in general terms.

Areas on the Unit with salinity issues, high road densities, and/or sensitive to disturbance (eg., Dolores River watershed) are identified in Chapter 3.3 ("Water" Section) of this EIS. This information is factored into the effects analysis that follows.

Desired Conditions, Objectives, Design Criteria, and Guidelines from the accompanying Forest Plan/RMP Revision that pertain to each sensitive fish species are identified in Appendix M, Table

M.2 of this EIS. These Revision components apply to all alternatives and help minimize impacts on aquatic species. They also include Forest Service and BLM manuals and handbooks, such as the Forest Service's Watershed Conservation Practices Handbook and BLM's Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, which prescribe extensive measures that apply to certain management activities that protect soil, riparian, and aquatic resources. In addition, lease stipulations on new oil and gas leases are listed in Appendix H of this EIS and help protect and minimize effects to aquatic resources.

A wide variety of land use practices may impact Colorado River cutthroat trout. The effects from water use and development projects (including diversion ditches, storage reservoirs, pipelines, wells, etc) on Colorado River cutthroat trout immediately downstream from these projects is from reduced or eliminated stream flows and reduced or eliminated fishery habitat that is not available for use. Additional impacts include increased stream temperatures and reduced dissolved oxygen levels. These effects could be more pronounced during periods of natural cyclic flow reductions (in fall and winter) or during summer months in a drought. Also, snowmaking for ski areas that drains water from streams or from water wells that are likely connected by groundwater to streams also reduces winter base flows that are limiting to habitat and populations of this species. Life cycles of species can be disrupted.

Depending on the location of the water use and development project, the effects on Colorado River cutthroat trout could vary from no impact to a moderately adverse impact immediately downstream of the project under all alternatives. Again, the impacts are predominately due to water depletions and reduced stream flows and the subsequent effects on fishery habitat available for use. The impacts are not expected to vary between alternatives since the demand for water use authorizations are driven by proponents rather than by San Juan Public Land's programs or budgets.

Livestock grazing can degrade in-stream habitat and water quality. Effects generally are increased sedimentation, increased stream temperatures, and fecal/bacteria contamination. The effects from livestock grazing and big game use under all alternatives may adversely affect specific individuals but would overall be minor for the populations of Colorado River cutthroat trout. Because of the lag time to influence existing conditions, Alternative C with its reductions in suitable and available livestock grazing areas may reduce grazing effects on fisheries from the present conditions in the long-term, but not in the short-term. For Alternative D with its increases in suitable and available livestock grazing areas, grazing may increase effects on these fisheries from the present in the long-term, but not in the short-term. Although there will be localized improvements in grazing management and implementation of rangeland health improvement projects, the impacts of sediment and increased water temperatures on fishery habitat quality should continue.

The effects of roads are primarily through sediment production. Eroded material may be delivered to streams as fine sediment and deposited in channels or transported downstream. The actual amount of sediment from these land disturbing activities that reaches stream channels or still water bodies would be a result of numerous factors including the location of roads, number of road/stream crossings, slope steepness and length, amount of exposed soil, type of vegetation in the area, frequency and intensity of rainfall, soil type and the implementation and effectiveness of BMPs. Heavy sediment loads can reduce pool depths, bury stream substrates and spawning gravels, adhere to aquatic insects and the gills of fish, alter channel form and function, and result in other forms of habitat degradation. Improperly placed, shaped, and sized culverts can act as fish barriers on key streams or exacerbate erosion and cause head-cutting. In addition to being potential sediment sources, roads and specifically road crossings create opportunities for stocking of non-native fish and for introducing diseases such as whirling disease. Roads may be sediment sources and closing them has a beneficial impact on stream. Additionally, closing roads which provide access to Colorado River cutthroat trout streams would reduce fishing pressure and have a positive impact on the Colorado River cutthroat trout population. Because of the locations of streams with conservation populations, roads under all alternatives may adversely impact individuals but would overall be minor for the population of the Colorado River cutthroat trout.

Reasonably foreseeable future oil and gas development is projected to impact watersheds east of Pagosa Springs (in the San Juan Sag area) predominately on national forest lands, and on the BLM portion (in the Disappointment Valley, Big Gypsum Valley, and Dry Creek Basin, and along the Dolores River Canyon) and on the national forest portion (in the Glade and McPhee Reservoir areas, and along the Dolores River Canyon) of the Paradox Basin. Within the Paradox Basin, there are two types of possible gas development (ie., conventional gas and Gothic Shale gas). In the San Juan Sag area, exploration could include one to two wildcat wells per year.

The Paradox Basin would develop as a field of 1,350 federal wellpads within an area of approximately 400,000 acres. The progression of development would involve an exploratory phase of approximately seven years followed by full field development in which over 100 wells are drilled per year. Paradox Basin gas development would result in direct impact of approximately 4,500 acres due to well and road construction. Approximately 40-percent of this development would be on existing leases and 60- percent on future leases. This level of disturbance would involve clearing of approximately one-percent of total land area where development is projected.

New gas development on 80-acre spacing units in the Northern San Juan Basin would result in 200 new or expanded federal well pads with a corresponding 300 acres of disturbance within a 125,000 acre area. All San Juan Basin development would be on existing leases and guided by best management practices.

Where oil and gas facilities are developed within the prospective areas, soil erosion and sediment deposition, and corresponding potential to impact aquatic and riparian habitat would be limited first by implementing the above lease requirements that require avoidance of sensitive, erosion prone areas and riparian areas, and secondly by the application of the design criteria listed above, that include, for example, graveling road surfaces to avoid dust and loss of soil to wind erosion; revegetating or covering any soil stockpiles that would remain for extended periods to avoid significant wind and water erosion; installing slope breaks and silt fences on slopes to slow and filter storm water runoff that might carry exposed soils to surface water drainages; timely reclamation of disturbed areas to minimize erosion after construction of facilities; and avoiding locations having highly erosive soils where possible. Non productive wells, referred to as dry-holes, would immediately be reclaimed.

Overall, the impacts to fisheries and aquatic species from oil and gas leasing and development within the San Juan Sag, the Paradox Basin, and the Northern San Juan would be mainly related to reduced stream-flows over time due the water used in the drilling and completion process and to the dewatering of gas-producing rock formations. This would, subsequently, reduce fishery habitat available for use, magnify any increased sediment effects, and result in degraded fishery habitat (as well as in the potential for contamination from petroleum products, drilling mud, and other contaminants).

During oil and gas development, water can be removed from the ecosystem by two ways. First, generally small amounts of water will be used during the drilling and completion process, except in the development of Gothic Shale gas which requires larger quantities of water. Typically, this water is hauled on-site by water trucks and removed as a waste sludge. This water usage occurs with all drilling operations. Water is also used in dust abatement to these well pads and during hydrostatic testing of pipelines. Second, water can be depleted during gas field production. Here, water is produced or pumped from the gas producing formations in order to release the pressure on the gas tied-up in the seam and allow it to flow.   For coalbed methane gas wells for instance, this water is transported to a disposal well for re-injection into a formation several thousand feet lower than where it was removed.  Because of the possible connectivity of this produced groundwater to surface water streams, gas production may affect stream-flow.

For conventional, coalbed methane, and Gothic Shale gas wells, approximately 1.4 acre-feet per well, 0.7 acre-feet per well, and 7.9 to 13.1 acre-feet per well of water, respectively, are anticipated to be used in the well drilling and completion process.  The level of water used for Gothic Shale gas wells (GSGP) in the Paradox Basin is 6 to 11times the amount of water used to drill and complete a conventional gas well, and 11 to 18 times the amount of water used to drill and complete a coalbed methane gas well.  It is assumed that all water associated with GSGP gas development and production would have to be purchased and trucked into the project area, as the water would not be obtained from water sources on public land.  The sources of this private water are unknown, but would occur within the San Juan River Basin and Dolores River Basin.  Since this water is connected to a Federal action, it is considered a depletion from a major river basin, and would require preparation of a biological assessment and coordination and consultation with the US Fish and Wildlife Service (FWS) for threatened and endangered species (TES), under Section 7 of the Endangered Species Act.  Because of difficulties in quantifying effects on stream-flow, water depleted due to gas field production was not estimated.

For Alternative A, as an example, the two tables below describe the water used in the drilling and completion process.  Table S-BE-3 displays the acre-feet of water used over 15 years for the future and existing leases on combined Forest Service and BLM public lands, and on non-Federal leases. Table S-BE-4 describes the average, annual acre-feet of water used by the Forest Service and BLM for the future leases during the exploratory and production phases by river basins.

**Table S-BE 15 - Water Used in Well Drilling and Completion (Acre-Feet) Over 15 Years for both Forest Service and BLM Public Lands**

| Projected Development Areas | Future Leases | Existing Leases | Non-Federal Leases | Total |
|---|---|---|---|---|
| **Paradox** | 5,657 | 3,275 | 6,572 | 15,504 |
| **Northern San Juan Basin** | 0 | 296 | 268 | 564 |
| **San Juan Sag** | 35 | 7 | 0 | 42 |
| **Total** | 5,692 | 3,578 | 6,840 | 16,110 |

**Table S-BE-16 – Average Annual Water Used in Well Drilling and Completion (Acre-Feet/Year) for Future Leases on Forest Service and BLM Public Lands by River Basins**

| | Years | Dolores River | San Juan River | Total |
|---|---|---|---|---|
| Forest Service | 1 to 7 | 62 | 4 | 66 |
| Forest Service | 8 to 12 | 364 | 21 | 385 |
| Forest Service | 13 to 15 | 534 | 30 | 564 |
| BLM | 1 to 7 | 23 | 5 | 28 |
| BLM | 8 to 12 | 117 | 29 | 146 |
| BLM | 13 to 15 | 182 | 46 | 228 |

The effects of oil and gas leasing and development would generally be similar for all alternatives. Given the locations of the conservation populations and the lease parcels, the effects on Colorado River cutthroat trout would generally be negligible under all alternatives. Leasing stipulations for watershed, soils, steep slopes, riparian areas, wetland, and floodplain concerns and Colorado River cutthroat trout populations and habitat, would generally protect the species' habitat and minimize impacts. However, if oil and gas development is proposed in the vicinity of streams or potential habitat occupied with Colorado River cutthroat trout, the impacts could be moderately adverse immediately downstream over time. Again, the impacts are predominately due to water depletions and the subsequent effects from reduced stream-flows. If no new leases were made available, there would be no impacts on the Colorado River cutthroat trout because all existing leases would occur downstream of Colorado River cutthroat trout habitat.

Mining activities on the San Juan Public Lands can include recreational gold panning and suction dredging, gravel mining operations, hard-rock mining, uranium and vanadium mining, etc. Chapter 2 displays the potential acreage of disturbance per year from these activities. The effects to fisheries and aquatic species from mining or mining reclamation are mainly from erosion and sediment impacts (ie., degraded fishery habitat), saline runoff or heavy metal loading of streams (ie., toxic levels for aquatic species), and altered stream channels and associated fishery habitat. Depending on the location of the action, the effects of mining or mining reclamation, which is nearly identical under all alternatives, on Colorado River cutthroat trout could vary from no impact to adversely affecting specific individuals but would overall be minor for the Unit's population.

Timber harvesting within Forest Service standards has little impact on stream habitats except for the roads and trails necessary to skid logs to landings and to haul logs to mills. Construction and use of the roads exposes soil and may accelerate erosion. If these areas of bare soil are connected to the stream network, sedimentation can occur. Connectivity of disturbed areas can be due to road crossings, rills, gullies, and poorly designed road drainage systems. Fine sediments in streams can reduce spawning habitat and limit macroinvertebrate populations. If sediment enters the stream during incubation, it can smother the eggs. Sediment can also deposit in pools and reduce pool depth and volume. Adult fish may move out of these pools to find more suitable areas.

Beyond the effects of sediment from vegetation management, fisheries and aquatic species can be impacted by a reduction of streamside vegetation. A reduction in streamside vegetation can increase average annual and average daily stream temperature by reducing shade and decrease the recruitment of large woody debris in streams. Overhanging vegetation provides hiding cover for fish and it helps cool stream temperatures. Large woody debris recruitment is important, because it dissipates erosive stream energy, regulates sediment movement downstream, provides nutrients, and creates pools important to aquatic species.

The effects from vegetation management may adversely affect specific individuals but would overall be minor for the population of Colorado River cutthroat trout. Since all alternatives have generally the same levels of timber harvest, hazardous fuels treatment, etc. (only 1800 acres separate Alternative D with the greatest levels of harvest and Alternative C with the least amount of vegetation treatment), the effects would be nearly the same for all alternatives. Again, the impacts are driven by sediment and stream temperature influences on fishery habitat quality.

In regard to air quality, the effects of oil and gas development and other management activities on Colorado River cutthroat trout would be negligible over the life of the Management Plan. The Air Analysis was focused on the entire Unit, not just the Gothic Shale area in the Paradox Basin. It is a modeling effort with many assumptions, including a gas development scenario as depicted in the Reasonably Foreseeable Development (RFD). The potential impacts of nitrogen loading or sulfur dioxide deposition to lakes, streams, and the aquatic ecosystems and fish species would be a very slow and prolonged process. It would probably be very difficult to detect any measureable effects on aquatic ecosystems well beyond the life of the Management Plan.

Over the last 20 years, a variety of fish habitat improvement projects such as stream bank stabilizations, pool forming structure placements, spawning habitat enhancement, fish barriers, and culvert replacements have been implemented on the San Juan Public Lands. In addition, the Unit has assisted the Colorado Division of Wildlife in conserving and reintroducing genetically pure, wild populations of Colorado River cutthroat trout in selected streams, particularly in Hermosa Creek Watershed. On occasions and after project level analysis and public involvement, some desired, non-native fish populations are removed in order to favor establishment of native fish populations, such as the Colorado River cutthroat trout. In these instances, the San Juan Public Lands and Colorado Division of Wildlife work closely together to achieve all environmental objectives. Because of locations of specific streams with conservation populations or a reintroduction effort, these improvement projects would either have no impact or a beneficial impact to Colorado River cutthroat trout under all alterntives.

Cutthroat trout populations can be susceptible to overangling. The Colorado Division of Wildlife has an artificial lures and catch and release regulation on many Colorado River cutthroat trout streams. Angling mortality is rarely heavy enough to reduce population viability, but it can change the age structure of fish populations. Loss of breeding individuals could lead to increased inbreeding and long-term loss of viability.

Whirling disease occurs in many fish hatcheries throughout Colorado and infected fish have been stocked statewide. Whirling disease is a parasitic, protozoan which attacks the cartilage of young fish. Whirling disease affects rainbow, cutthroat, brook, and to a lesser degree, brown trout. Mortality rates for rainbow, cutthroat, and brook trout can exceed 80%. Dramatic declines in rainbow trout populations have been recorded in the Madison River in Montana, and the Colorado and Fryingpan rivers in Colorado. Research has shown cutthroat trout are as susceptible as rainbows. Infected fish, birds, mammals, boats, fishermen, and other equipment can spread the spores from area to area.

**Cumulative Impacts:** The Colorado River cutthroat trout is both a Forest Service and BLM sensitive species as a result of past cumulative effects, on a local and regional basis. Like the other sensitive species, the primary adverse cumulative effects under all alternatives, presently, would occur from activities on the San Juan Public Lands that lead to further water depletions and reduced stream flows (ie., reduced or eliminated fishery habitat for use). Depending on the location of ground-disturbing activities, the cumulative effects of sedimentation may range from minor to moderately adverse for certain stretches of stream habitat and individual fish. To help avoid federal listing, the San Juan Public Lands will focus the majority of its fishery habitat improvement efforts in the next 10-15 years to the recovery of the Colorado River cutthroat trout.

With the exception of some lands in the upper Animas watershed and the northwestern portions of the San Juan Public Lands, there are no water courses that originate on lands of other ownership that flow onto the San Juan Public Lands. Importantly for the Colorado River cutthroat trout, the cumulative effects of activities from private lands, Indian tribal lands, and other jurisdictions that could affect this species are generally downstream from the remaining Colorado River cutthroat populations, their potential habitat, or potential recovery areas. For instance, it is likely there will be cumulative effects from as many as 2,500 new gas wells drilled on or adjacent to the San Juan Public Lands over the next planning period. In addition to an estimated 800 new wells that may be drilled on new leases (discussed under Direct and Indirect Impacts), there could be as many as 200 new and infill gas wells drilled in the northern San Juan Basin, 1000 new wells drilled on the Southern Ute Tribal lands adjacent to the Unit, and 1300 new wells on previously leased land in the Paradox Basin. The Reasonable and Foreseeable Development projected wells would require new roads, pipelines and associated disturbance for gas well construction. Consequently, oil and gas development may have large potential to have substantial cumulative effects when compared to all other activities that affect the San Juan Public Lands. The magnitude of new road/pipeline construction and other disturbances would vary only slightly by alternative.

**Effects Determination:** Management Area allocations influence land management activities and public use. Although Desired Conditions, Objectives, Design Criteria, and Guidelines have been included to address Colorado River cutthroat trout and other fish species, there is still risk inherent in concentrating these activities in areas with cutthroat trout. Therefore, all alternatives in this Forest Plan/RMP Revision **MAY ADVERSELY IMPACT INDIVIDUALS, BUT NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE.**