



United States Department of the Interior
FISH AND WILDLIFE SERVICE

UTAH FIELD OFFICE
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

October 29, 2008

In Reply Refer To
FWS/R6
ES/UT
08-F-0068
6-UT-08-F-024

Memorandum

To: Field Office Manager, Bureau of Land Management, Monticello Field Office,
P.O. Box 7, Monticello, Utah 84535

From: Utah Field Supervisor, U.S. Fish and Wildlife Service, Ecological Services, West
Valley City, Utah

Subject: Biological Opinion for BLM Resource Management Plan, Monticello Field Office

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of potential activities described and authorized under the Resource Management Plan (RMP) for the Bureau of Land Management's (BLM) Monticello Field Office (MFO) and their potential effects on the federally threatened Mexican spotted owl (*Strix occidentalis lucida*), Navajo sedge (*Carex specuicola*), and federally endangered southwestern willow flycatcher (*Empidonax traillii extimus*), California condor (*Gymnogyps californianus*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), bonytail (*Gila elegans*), and razorback sucker (*Xyrauchen texanus*) in accordance with Section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). In addition, this document includes the Conference Opinion for the candidate species yellow-billed cuckoo (*Coccyzus americanus*), and the experimental, non-essential population of the endangered California condor (*Gymnogyps californianus*). Critical habitat designated for the Mexican spotted owl on February 01, 2001 was re-designated on August 31, 2004 (66 FR 8530, 69 FR 53181). Critical habitat was designated for the listed Colorado fish (Colorado pikeminnow, humpback chub, bonytail, and razorback sucker) on March 21, 1994 (59 FR 13374). Critical habitat was designated for the southwestern willow flycatcher on October 12, 2004 (69 FR 60705); critical habitat for this species does not occur within the MFO planning area. Your request for initiation of formal consultation for all aforementioned species was received on September 30, 2008.

Proposed activities identified in the proposed Monticello RMP are categorized into 19 programs, as follows:

- Air Quality
- Cultural Resource Management
- Paleontological Resources Management
- Fire Management
- Healthy and Safety Management
- Lands and Realty Management
- Livestock Grazing Management
- Minerals Management
- Non-WSA Lands with Wilderness Characteristics Management
- Recreation Management
- Riparian Area Management
- Soils and Watershed Management
- Special Designations Management
- Special Status Species Management
- Travel Management
- Vegetation Management
- Visual Resource Management
- Wildlife and Fisheries Management
- Woodland Resources Management

This biological opinion is based on information provided in the September 30th Biological Assessment, personal communications between the Service's biologists and the BLM's biologists, telephone conversations, e-mail correspondence, conference calls, planning meetings, and other sources of information. A complete administrative record of this consultation is on file at this office.

Consultation History

This section summarizes significant steps in the consultation process. Additional correspondence, email transmissions, telephone conversation records, and conference calls that occurred between December 15, 2004, and October 31, 2008 are documented in the administrative record for this consultation.

Previous Section 7 consultations have been conducted for activities located within the Monticello planning area that have resulted in the development of the terms and conditions and conservation measures that will be a part of the committed mitigation of the proposed plan. These consultations include the following:

- Programmatic Section 7 Consultation on Existing Land Use Plans. A biological opinion was received from USFWS on June 19, 2007 (USFWS 2007). Finalized Conservation Measures and Best Management Practices for T&E Species of Utah were developed and are included in the current land use plan revisions effort.

- Programmatic Section 7 Consultation on the oil and gas leasing program (USFWS 2004, BLM 2005). This consultation has been updated from time to time and the latest lease notices have also been included in the current revision effort.
- Consultation on the Fire Management Land Use Amendment (USFWS 2005a; USFW 2005b). Fire Management Resource Protection Measures were developed and are included in Appendix C.

Consultation activities specific to the current RMP revision effort include the following:

- March 18, 2008: The BLM electronically sent a draft Biological Assessment to determine impacts from the new Monticello Resource Management Plan.
- March 18 – May 21, 2008: The Service reviewed and provided comments on the draft Biological Assessment;
- August 8, 2008: The BLM electronically sent a second draft Biological Assessment to the Service;
- August 26, 2008: The Service reviewed and provided more comments on the draft Biological Assessment;
- September 30, 2008: We received the final version of the Biological Assessment and initiated formal consultation.

PROGRAMMATIC BIOLOGICAL OPINION

TABLE OF CONTENTS

DESCRIPTION OF THE PROPOSED ACTION	6
DESCRIPTION OF ACTIVITIES AND MANAGEMENT PRESCRIPTIONS UNDER THE MONTICELLO RMP.....	9
<i>Air Quality</i>	9
<i>Cultural Resources</i>	9
<i>Paleontological Resources</i>	10
<i>Fire Management</i>	10
<i>Health and Safety Management</i>	11
<i>Lands and Realty Management</i>	12
<i>Livestock Grazing Management</i>	13
<i>Energy and Mineral Resource Management</i>	14
<i>Non-WSA Lands with Wilderness Characteristics</i>	16
<i>Recreation Management</i>	16
<i>Riparian Management</i>	17
<i>Soils and Watershed Resources</i>	17
<i>Special Designations</i>	18
<i>Special Status Species Management</i>	20
<i>Travel Management</i>	20
<i>Vegetation Management</i>	21
<i>Visual Resource Management</i>	21
<i>Wildlife and Fisheries Resource Management</i>	22
<i>Woodlands Management</i>	22
CONSERVATION MEASURES.....	23
SPECIES ACCOUNTS, EFFECTS, AND CONCLUSIONS	24
MEXICAN SPOTTED OWL (<i>STRIX OCCIDENTALIS LUCIDA</i>).....	24
SOUTHWESTERN WILLOW FLYCATCHER (<i>EMPIDONAX TRAILLII EXTIMUS</i>)	37
NAVAJO SEDGE (<i>CAREX SPECUICOLA</i>)	51
BONYTAIL (<i>GILA ELEGANS</i>)	55
COLORADO PIKEMINNOW (<i>PTYCHOCEILUS LUCIUS</i>).....	58
HUMPBACK CHUB (<i>GILA CYPHA</i>).....	63
RAZORBACK SUCKER (<i>Xyrauchen texanus</i>)	68
EXPERIMENTAL POPULATIONS SPECIES FOUND IN THE ACTION AREA	81
CALIFORNIA CONDOR (<i>Gymnogyps californianus</i>).....	81
CANDIDATE SPECIES FOUND IN THE ACTION AREA	90
WESTERN YELLOW-BILLED CUCKOO (<i>Coccyzus americanus</i>)	90
INCIDENTAL TAKE STATEMENT	100
REASONABLE AND PRUDENT MEASURES / TERMS AND CONDITIONS	101

RECOMMENDED CONSERVATION MEASURES 101
RE-INITIATION STATEMENT 106
LITERATURE CITED 107
APPENDIX A 134

LIST OF TABLES

**TABLE 1. FEDERALLY PROTECTED UTAH SPECIES ON BLM LANDS ANALYZED IN THIS BIOLOGICAL OPINION (BO) FOR
THE PROPOSED MONTICELLO RESOURCE MANAGEMENT PLAN 8**

DESCRIPTION OF THE PROPOSED ACTION

The proposed action examined in this consultation is the implementation of land management activities described and authorized by the revised Monticello Resource Management Plan (RMP). The RMP and the Environmental Impact Statement (EIS) would provide planning guidance for public lands managed by the Monticello FO in San Juan and Grand Counties in southeastern Utah for the next 15 to 20 years. RMPs are used by the BLM to guide and manage future actions and set standards upon which future decisions on site-specific activities will be based. RMPs only establish general management policy on a broad scale. They are not used to make site specific decisions that commit resources on a small scale such as on specific parcels of land. RMPs also identify desired outcomes, also known as “desired future conditions”. These outcomes are expressed in the RMPs as goals, standards, objectives, and allowable uses and actions needed to achieve desired outcomes. These are often referred to as RMP decisions or resource allocations. It is upon these RMP decisions or resource allocations that the effects determinations in this Biological Opinion are based for:

- Mexican spotted owl (*Strix occidentalis lucida*)
- Southwestern willow flycatcher (*Empidonax traillii extimus*)
- Navajo sedge (*Carex specuicola*)
- Colorado pikeminnow (*Ptychocheilus lucius*)
- Humpback chub (*Gila cypha*)
- Bonytail chub (*Gila elegans*)
- Razorback sucker (*Xyrauchen texanus*)
- California condor (*Gymnogyps californianus*)

In addition, our Conference Opinion considers the effects for the following experimental, non-essential and candidate species:

- California condor (*Gymnogyps californianus*) (south of I-70 and west of Highway 191)
- Yellow-billed cuckoo (*Coccyzus americanus*)

The Monticello planning area includes approximately 4.5 million acres of private land. State of Utah, Navajo Nation, national forest, national park, and BLM administered public lands located in San Juan and Grand counties in southeastern Utah. BLM manages some 1.8 million surface acres and nearly 2.5 million sub-surface acres. The planning area lies almost entirely within San Juan County, with a small portion in southern Grand County., State lands, privately owned lands, Natural Bridges National Monument, Hovenweep National Monument, Canyonlands National Park, Glen Canyon National Recreation Area, Manti-La Sal National Forest, and Navajo Nation are all located in or adjacent to lands administered by the MFO. Therefore, federally listed species and their habitat located on these lands could be indirectly affected by resource management decisions made in the RMP. In addition, segments of the Colorado and San Juan Rivers located adjacent to the planning area are included in this analysis because of the potential impact of water withdrawals and habitat modification identified in the proposed plan on the four endangered fish species and their habitat downstream.

The BA identified the Monticello planning area as potential habitat for the black-footed ferret. However, no known populations of the ferret are known to occur within the planning area boundaries. No reintroductions are currently planned. Therefore, the BA did not analyze potential impacts to the ferret and it will not be further discussed in this document.

Table 1. Federally Protected Utah Species on BLM Lands Analyzed in this Biological Opinion (BO) for the Proposed Monticello Resource

Management Plan. “Likely to adversely affect” determinations (LAA) are used if a program may have any direct or indirect adverse effect to a threatened or endangered species. “May affect, not likely to adversely affect” (NLAA) determinations conclude that activities occurring under the program are either insignificant or beneficial. “No effect” (NE) determinations conclude that the species and critical habitat will be unaffected by the proposed activities under the program. “Not likely to contribute to Federal listing” (NCFL) are listed for candidate species if the program was determined not to contribute to its listing as a threatened or endangered species. “No Jeopardy” (NJ) are listed if the program was determined not to jeopardize an experimental, non-essential population.

Programs	Cultural Resources	Fire Management	Health and Safety	Lands and Realty	Livestock Grazing	Minerals and Energy	Non-WAS lands with Wilderness Characteristics	Paleontological Resources	Recreation Areas	Riparian	Soils and Watershed	Special Designations	Special Status Species Management	Travel Management	Vegetation Management	Visual Resources	Wildlife and Fisheries Management	Woodland Resources
Common Name (Scientific Name)																		
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	LAA	LAA	LAA	LAA	LAA	LAA	NLAA	LAA	LAA	LAA	LAA	LAA	NLAA	LAA	LAA	NLAA	LAA	LAA
Southwestern willow Flycatcher (<i>Empidonax traillii eximius</i>)	LAA	LAA	LAA	LAA	LAA	LAA	NLAA	LAA	LAA	LAA	LAA	LAA	LAA	LAA	LAA	NLAA	LAA	LAA
Navajo sedge (<i>Carex specuicola</i>)	NLAA	NLAA	NLAA	NLAA	LAA	LAA	NLAA	LAA	LAA	NLAA	NLAA	NLAA	NLAA	LAA	NLAA	NLAA	LAA	NLAA
Bonytail (<i>Gila elegans</i>)	LAA	LAA	LAA	LAA	LAA	LAA	NLAA	LAA	LAA	LAA	LAA	LAA	NLAA	LAA	LAA	NLAA	LAA	LAA
Colorado pikeminnow (<i>Psychocheilus lucius</i>)	LAA	LAA	LAA	LAA	LAA	LAA	NLAA	LAA	LAA	LAA	LAA	LAA	NLAA	LAA	LAA	NLAA	LAA	LAA
Humpback chub (<i>Gila cypha</i>)	LAA	LAA	LAA	LAA	LAA	LAA	NLAA	LAA	LAA	LAA	LAA	LAA	NLAA	LAA	LAA	NLAA	LAA	LAA
Razorback sucker (<i>Xyrauchen texanus</i>)	LAA	LAA	LAA	LAA	LAA	LAA	NLAA	LAA	LAA	LAA	LAA	LAA	NLAA	LAA	LAA	NLAA	LAA	LAA
California condor (<i>Gymnogyps californianus</i>) (experimental, non-essential)	NJ	NJ	NJ	NJ	NJ	NJ	NJ	NJ	NJ	NJ	NJ	NJ	NJ	NJ	NJ	NJ	NJ	NJ
California condor (<i>Gymnogyps californianus</i>)	LAA	LAA	LAA	LAA	LAA	LAA	NLAA	LAA	LAA	LAA	LAA	LAA	NLAA	LAA	LAA	NLAA	LAA	LAA
Western yellow-billed cuckoo (<i>Coccyzus americanus occidentalis</i>)	NCFL	NCFL	NCFL	NCFL	NCFL	NCFL	NCFL	NCFL	NCFL	NLCN	NCFL	NCFL	NCFL	NCFL	NCFL	NCFL	NCFL	NCFL

Description of Activities and Management Prescriptions under the Monticello RMP

Air Quality

The primary objective of air quality management within the Monticello planning area is to maintain air quality in accordance with standards prescribed by federal and state laws and regulations. The air quality program does not consider potential impacts to fish and wildlife resources beyond the standards set forth by EPA and the Utah Department of Environmental Quality. Air quality management actions include managing air quality in accordance with standards provided by federal, state and local laws and regulations, compliance of the Clean Air Act, mitigation of actions that compromise ambient air quality standards or visibility within the Class I air areas, and compliance with Utah Administrative Code Regulation R307-205, which prohibits the use, maintenance, or construction of roadways and disturbed areas without taking appropriate dust abatement measures. Compliance would be obtained through special stipulations as a requirement on new projects and through the use of dust abatement control techniques in problem areas.

Cultural Resources

The objective of the cultural resource management program is to protect, preserve, interpret, and manage significant cultural resources for their informational, educational, recreational, and scientific values. Site-specific inventories for cultural resources are required before the start of surface disturbance or if BLM-administered lands were proposed for transfer out of federal ownership.

The BLM performs inventories as well as land management. During inventory activities, the BLM inventories, categorizes, and preserves cultural resources, conducts field activities, performs excavations; maps and collects surface materials, researches records, and photographs sites and cultural resources. Inventory data collection is used for documentation and development of mitigation plans before other resource program surface disturbance. Inventory activities commonly entail the use of hand tools, power tools, or heavy machinery. Survey intensity varies among inventories and may last from one day to several weeks.

Cultural resource land management may involve: developing interpretive sites; authorizing installation of protective fencing; stabilizing deteriorating buildings; performing certain surface-disturbing activities; pursuing land withdrawals; designating avoidance areas; pursuing cooperative agreements; and identifying and interpreting historic trails. Cultural resource management may restrict certain land uses, close certain areas to exploration and prohibit some surface-disturbing activities.

Other cultural resource decisions under the Proposed Plan include provisions for developing cultural plans at appropriate cultural resource sites or areas in a manner that does not adversely impact the resource. Such plans would include protective measures such as restriction and limitations on recreation around cultural at-risk areas and sites, Native American consultation, and regulatory compliance, including Section 7 consultation. These plans would also include but not be limited to developing cultural monitoring systems, identifying sites and areas in need of

stabilization and protective measures (e.g., fences, surveillance equipment); developing research designs for selected sites/areas; designating sites/areas for interpretive and educational development (e.g., signs, kiosks) identifying areas for cultural inventory where federal undertakings are expected to occur; and developing specific mitigation measures.

Reasonable access to specific sacred sites would be allowed under the American Indian Religious Freedom Act. Cultural plants, once identified by interested tribes, would be managed to insure that ground-disturbing activities on the land do not contribute to the decline of cultural sensitive plant communities. Collection of plant resources would be considered on a case-by-case basis and would be allowed where practical and appropriate.

Surface disturbance is generally avoided near significant cultural resource sites and within ¼ mile of the visual horizon of significant segments of historic trails and canals. Sites listed on, or eligible for, the National Register for Historic Places (NRHP) are protected and would be managed for their local and national significance in compliance with the National Historic Preservation Act, the Archaeological Resources Protection Act, the American Indians Religious Freedom Act, and the Native American Graves Protection and Repatriation Act, as appropriate.

Paleontological Resources

The objective of the paleontological resource management program is to protect, preserve, interpret, and manage significant paleontological resources for their informational, educational, recreational, and scientific values. Site-specific inventories for paleontological resources are required before the start of surface disturbance or if BLM-administered lands were proposed for transfer out of federal ownership.

During inventory activities, the BLM inventories, categorizes, and preserves paleontological resources, conducts field activities, performs excavations; maps and collects surface materials, researches records, and photographs sites and paleontological resources. Inventory data collection is used for documentation and development of mitigation plans before other resource program surface disturbance. Inventory activities commonly entail the use of hand tools, power tools, or heavy machinery.

Paleontological resource land management may involve: developing interpretive sites; authorizing installation of protective fencing; performing certain surface-disturbing activities; pursuing land withdrawals; designating avoidance areas; pursuing cooperative agreements; and identifying and interpreting historic trails. Paleontological resource management may restrict certain land uses, close certain areas to exploration and prohibit some surface-disturbing activities. This program also allows the collection of any fossil vertebrates, significant fossil invertebrates, and plants in all areas except in specified areas with a required paleontological collecting permit. Archeological collections are authorized through a permit system. Recreational permitting is allowed for common invertebrate and plant fossils.

Fire Management

Objectives of fire management are to protect life, property, and resource values from wildfire and to restore the natural role of fire in the ecosystem. The major activities involved with the BLM fire management program include: wildfire suppression, managing natural ignitions as

wildland fire use for resource benefit, prescribed burning, non-fire fuels treatment for hazardous fuels reduction, and emergency stabilization and rehabilitation following wildfires.

Wildfires are suppressed when they threaten values and resources, such as: wildland urban interface areas, developed recreation sites, areas that are unlikely to recover following fire (i.e., areas of noxious weeds or invasive species), sensitive soils, critical TES habitat, or fires with potential to spread to private, state, or other federal lands. Fire suppression methods vary with the intensity of the wildfire and are conducted on an emergency basis. Firelines may be constructed by hand or by heavy equipment to contain the wildfire. Water may be withdrawn from nearby sources to suppress fires. Chemical fire suppression agents and retardants may be used, if necessary. The use of aerial fire retardant is restricted near water resources. After a fire is extinguished, the BLM may use emergency stabilization and rehabilitation techniques, such as seeding and soil stabilization actions, to restore a burned or suppressed area to its previous vegetation cover. These suppression and post-suppression activities often employ the use of off-road vehicles, hand tools, and heavy equipment such as bulldozers.

Wildland fire use is implemented in areas that would benefit from the reintroduction of fire. Some suppression techniques, as described above, may be used to keep the fire within pre-determined boundaries, but no emergency stabilization and rehabilitation actions are taken following wildland fire use.

Prescribed fire and non-fire fuels treatment objectives are to restore natural fire regimes, reduce hazardous fuel loading, and enhance resources such as wildlife habitat. Prescribed fires follow a pre-determined prescription and include activities such as broadcast burning or pile burning following manual or mechanical fuel treatments. Under the proposed plan, fuels management actions include surface-disturbing treatments on 5,000 to 10,000 acres annually. The majority of these treatments would likely be concentrated in the pinyon-juniper vegetation type, including historical sagebrush/grassland that has been encroached upon by pinyon-juniper (BLM 2005). Approximately 92% of this vegetation type is in fire regime/condition class (FRCC) 3, which indicates that it suffers high departure (>66% variation) from historical fire return interval and/or vegetation condition/fuel loading. The main reasons the majority of the pinyon-juniper in the planning area falls within this FRCC are 1) loss of native understory of pinyon-juniper stands; 2) cheatgrass invasion of disturbed pinyon-juniper stands; and 3) fuel loading in uncharacteristically thick pinyon-juniper stands (BLM 2005). Impacts would be analyzed under site-specific NEPA once it is determined where individual treatments would occur. These actions include mechanical and manual treatments, prescribed fire, chemical or biological vegetation control, and aerial/ground seeding.

Health and Safety Management

The primary objective of health and safety management is to protect public and environmental health and safety on lands administered by BLM. Hazardous materials and waste management policies are integrated into all BLM programs. Several federal, state, and local laws overlap in their requirement of BLM to identify and remediate contaminated sites on public lands. Besides managing pre-existing contamination, BLM seeks to prevent or minimize contamination caused by BLM authorized actions.

State Office and field office contingency plans specify how personnel are supposed to respond to a hazardous substance incident, such as hazard recognition, retreating procedures, record keeping, and reporting. Contingency plans recommend using signs, fencing, and/or barricades for site security, unless such actions would create an attractive nuisance. Emergency spill response may necessitate containment measures such as building dikes, or overland vehicle and equipment travel.

Removal and remedial actions taken under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) as amended 42 U.S.C. § 9601 et seq. must follow the National Contingency Plan (NCP). Proposed CERCLA removal or remedial actions must address Applicable or Relevant and Appropriate Requirements (ARARs), which include all necessary Endangered Species Act considerations. Non-CERCLA removal and remedial actions, such as RCRA actions, would be reviewed under the NEPA process.

The abandoned mine lands program addresses the environmental and safety hazards associated with AML sites on public lands. Once the sites are identified, they are prioritized, and appropriate actions are taken on those historic mine sites that pose health and safety risks. The BLM will identify and clean up unauthorized dumping sites and hazardous materials spills in the MFO as required to comply with applicable State, local, and Federal regulations. The priority for the reclamation of environmentally contaminated sites is based on risk assessments that address threats to human health and threats to the environment. For example, abandoned mine land sites that impact water quality are usually a greater concern and receive a higher priority for reclamation than those that do not impact water quality. As part of the Proposed Action, abandoned mine lands would be prioritized for area reclamation and mitigation. All applicable AML regulations would be complied with, and site-specific NEPA analysis would be required on all potential sites.

Lands and Realty Management

The objectives of the lands and realty management program are to support multiple-use management goals of other BLM resource programs; respond to public requests for land use authorizations, sales, and exchanges; and acquire and designate right-of-way access to serve administrative and public needs.

Public land tracts that are not critical to current management objectives will be disposed of through the realty management program (reviewed on a case-by-case basis). Non-federal lands may be acquired through exchange in areas with potential for recreation development or in areas containing important wildlife, cultural, scenic, natural, open space, or other resource values. Protective withdrawals may be established to protect and preserve important resource values, but require extensive mineral investigations.

Realty management authorizes occupancy of public lands for roads, power lines, pipelines, communication sites, and irrigation ditches authorized by granting rights-of-way. Rights-of-way management actions respond to public requests for access, land authorizations, sales, and exchanges. These rights-of-way may be temporary or extend up to 30 years, or in perpetuity. BLM also pursues access across private lands, rehabilitates access roads that are no longer needed, and proposes easement negotiations. The Proposed Plan would include the authorization

of ROW development except in wilderness study areas, wilderness areas, threatened and endangered species habitat, avoidance areas (133,293 acres), and exclusion areas (416,115 acres). Applications for filming permits would only be granted if site-specific NEPA analysis showed that federally listed and sensitive species would not be impacted. Filming permits would be granted in previously disturbed areas (i.e. existing roads and pullouts) without site-specific analysis. Under the Proposed Plan, 50,665 acres would be recommended for withdrawal from mineral entry, including Grand Gulch National Historic District, all developed recreation sites, San Juan River SRMA, Colorado River Segment 3, and Alkali Ridge National Historic Landmark.

The program pursues cooperative agreements, develops recreation site facilities, considers offsite mitigation, minimizes access in wildlife habitat, fences revegetation sites, blocks linear rights-of-way to vehicle use, considers temporary-use permits, considers new withdrawals, and identifies parcels for landfills under the Recreation & Public Purposes Act. Areas with important resource values will be avoided where possible when planning routes and installation of new facilities. Effects will be mitigated if it becomes necessary to place facilities within avoidance areas.

Livestock Grazing Management

The objective of livestock grazing management is to maintain or improve forage production and range condition as a sustainable resource base, while improving wildlife habitat and watershed condition and meeting Utah's Rangeland Health Standards. Grazing allotments are prioritized by and classified into one of three management categories: maintain (M), improve (I), and custodial (C).

Not all BLM lands are open to livestock grazing due to conflicts with other resource uses. Grazing in portions of allotments would be manipulated to reduce impacts on highly saline soils and to reduce salinity in the Colorado River drainage. Under the Proposed Plan, grazing would be excluded from 134,277 acres in the Monticello PA (BLM 2008). Approximately 962 acres in the Dark Canyon area, Moki Canyon, and Lake Canyon are limited to livestock trailing to help protect sensitive species. Approximately 15,720 acres within East Canyon and Peter's Canyon would be excluded from livestock grazing to protect wildlife habitat. New allotments would be added in South Vega, Upper Mail Station, and Big Westwater, while allotments would be taken out of other areas, which include Dodge Canyon and Rogers Allotments. In addition, the Proposed Plan would include the closure of five Comb Wash side canyons. Under the Proposed Plan, grazing would be reduced in areas where the native vegetation appears to be overburdened. Additionally, the BLM would develop seasonal restrictions, closures, and/or forage utilization limits on grazing in riparian areas that are determined to be Functioning at Risk and/or Non-functional. These determinations would be made through monitoring activities involving vegetation trend and forage utilization measurements and riparian health assessments.

Range management activities may include vegetation treatments such as prescribed fire or mechanical and chemical control of noxious weeds, sagebrush, and other target species. The determinations and effects analyses associated with the potential impacts of these treatments can be located under the other appropriate program headings (i.e., fire treatments – see Fire Management, or vegetative treatments – see Vegetation Management)

Other range improvements authorized by the livestock grazing management program may include fence construction, water developments, exclosures, and livestock handling facilities. Salt or mineral supplements may be approved to help manage livestock distribution. These projects are designed and constructed to implement grazing systems that are designed to meet Rangeland Health Standards and improve watersheds conditions, wildlife habitat, riparian proper functioning conditions, and forage production. The administration of the range program includes the issuance of grazing permits, monitoring key areas within allotments, developing management plans and agreements, and use supervision to assure compliance with the terms and conditions of the grazing permits.

Energy and Mineral Resource Management

Mineral development is subject to leasing, location, or sale based on the Federal mineral law covering that particular commodity. The planning area will be open to consideration for exploration, leasing, and development of leasable minerals including oil, gas, coal, oil shale, and geothermal. The minerals program is divided into the three categories of salable, leasable, or locatable minerals.

Salable Minerals

Salable minerals anticipated for development in the project area include sand, gravel, building stone, and clay. Before issuing contracts or free use permits for salable minerals, the BLM conducts the appropriate environmental analyses including special studies or inventories of cultural resource values, threatened or endangered plant and wildlife species, and other resources. Stipulations or conditions may be included in the terms of the contract to ensure protection of the natural resources and reclamation of the land following project completion. Site reclamation is required following any surface-disturbing activity by mining for salable minerals. Reclamation includes removing surface debris, recontouring, reducing steep slopes, and planting vegetation. All reclamation proposals must conform to federal and state agency requirements.

Leasable Minerals

Leasable minerals anticipated for development include fluid (oil, and gas) and solid minerals such as coal, sodium, potash, and tar sands. There would be a total of 484,217 acres of land open for oil and gas leasing-standard stipulations, 66,108 open to oil and gas leasing subject to No Surface Occupancy (NSO), and 740,594 acres open for oil and gas leasing with special conditions (these include timing limitations, controlled surface use, or a combination of the two). Under the Proposed Plan, 493,400 acres would be unavailable for oil and gas leasing. In Utah, coal is generally extracted using underground mining methods although surface coal mine operations and methods are likely to be proposed for some future operations. Surface facilities include truck/train loadouts, offices, maintenance facilities, change house, electrical substations, and roads. Total surface disturbance is usually less than 20 acres.

Surface coal mining involves the use of draglines, shovels, and haul trucks and results in large areas of surface disturbance from road construction; topsoil and overburden removal; and stock piling of these materials. Reclamation includes recontouring as closely to the original landscape as possible, reconstruction of drainages, reseeding, and monitoring.

Fluid leasable minerals include oil, gas, and geothermal steam. In areas where development of oil and gas resources would conflict with the protection or management of other resources or public land uses, mitigation measures are identified and may appear on the leases as either stipulations to uses, or as restrictions on surface occupancy. Once the parcel is sold, it matures into a lease and is authorized for a 10 year period.

Initial geophysical exploration involves use of ATVs and vehicles to lay the geophones and drill the shot holes for charges, or “thumpers” to create the sound waves. Exploration for oil and coal bed natural gas may also include drilling more than one well. Surface disturbance during the exploration phase of drilling includes the construction of roads, well pads, reserve pits, and other facilities.

Development of oil and gas fields includes construction pads, storage tanks, storage tank batteries, oil and gas processing facilities and necessary pipeline, compressor engines and power lines right-of-ways. Generally, each drill site includes a 3 acre pad, 1 mile of road, and 1 mile of pipeline. Directional drilling requires a larger pad size and is dependent on the number of wells drilled from each pad.

Methods to dispose of residual water from oil and gas production include: subsurface re-injection, direct surface discharge, and discharge into a containment pond or pit. Chemically polluted water may be treated before surface discharge or may be reinjected. Geothermal resources are available for exploration, development, and production and are subject to the same surface disturbance restrictions and other stipulations applied to oil and gas exploration, development, and production.

Locatable Minerals

Locatable metallic minerals in the project area include copper, uranium-vanadium, placer gold and limestone. Under the Proposed Plan, 50,665 acres would be recommended for withdrawal from locatable mineral entry and 1,734,458 acres would be available for mineral entry. Also under the Proposed Plan, 435,338 acres would be unavailable for mineral disposal, 624,734 acres would be open to mineral disposal subject to standard terms and conditions, and 724,234 acres would be open to mineral disposal subject to special conditions.

Minerals that are normally locatable may be leasable on acquired lands. Minerals are locatable under the 1872 Mining Law. Most public lands are open to location with the exception of withdrawn lands. The Mining Law of 1872 sets the requirements for lode claims, placer claims, and mill sites as well as discovery, location, annual filings, assessment work, and mineral examinations to establish validity. Mining law allows for individuals and corporations to prospect for minerals on public domain lands, and upon making a discovery, to stake (or “locate”) a claim on that deposit. A claim gives the holder the right to develop the minerals and may be “patented” to convey full title to the claimant. This law is under constant scrutiny, and a continuing issue is whether this law should be reformed, and if so, how to balance mineral development with competing land uses. Since October 1, 1994, Congress has imposed a budget moratorium on BLM acceptance of any new mineral patent applications. Until the moratorium is lifted, the BLM will not accept any new applications.

Surface disturbance for uranium extraction includes processing plants, equipment maintenance buildings and offices, or other various extraction support facilities disturbing approximately 5-15 acres.

Potential impacts of locatable mineral developments include increased soil erosion resulting in increased sedimentation, some potential for release or exposure to toxic chemicals and wastes, individual mortality, localized population mortality, habitat loss/fragmentation, and reduction of reproductive success.

Non-WSA Lands with Wilderness Characteristics

The BLM has identified non-WSA lands with wilderness characteristics for management consideration under the RMP. Wilderness characteristics include the appearance of naturalness and outstanding opportunities for solitude or unconfined recreation. Primitive lands and backcountry landscapes would be managed for their undeveloped character, and to provide opportunities for primitive recreational activities and experiences of solitude, as appropriate. Under the Proposed Plan, 88,871 acres of non-WSA lands would be managed to protect, preserve, and maintain wilderness characteristics. An NSO stipulation would be applied to oil and gas leasing in Dark Canyon (11,540 acres), and Mancos Mesa (30,068 acres), Nokai Dome West (14,988 acres), Nokai Dome East (18,618 acres), and Grand Gulch (13,657 acres) would be unavailable to oil and gas leasing. Also, non-WSA lands with wilderness characteristics would be managed to preclude other surface-disturbing activities including mineral materials sales. These areas would be managed as VRM Class II, woodland harvest would be prohibited, vehicle use would be limited to designated roads, and development of ROWs would be avoided.

Recreation Management

The objectives of recreation management are to identify recreation values on public lands and make decisions which will ensure that these values are maintained on a long-term sustained yield basis to meet the recreational needs of the using public. Recreation management includes allowing recreational access by the public, developing and maintaining recreation areas, issuing special recreation permits for organized groups, competitive events and commercial outfitters and guides, acquiring recreational access, providing information to the public about recreation resources and assessing effects of recreational use to the environment. The BLM monitors recreational use, develops management plans, and evaluates recreational potential.

Through the land use planning process BLM identifies and designates special recreation management areas. These include areas which require greater recreation investment, where more intensive recreation management is needed and recreation is a principal management objective. Recreational activities may include hiking, hunting, mountain biking, boating, and fishing, OHV use (including snowmobiles), horseback riding, and camping.

Backcountry roads and trails provide a wide range of recreation opportunities for Off Highway Vehicle (OHV) users on public lands. These opportunities range from vehicle touring to vehicle access for hiking, hunting, fishing, and other numerous public land uses, as well as unconfined vehicle use at designated open areas.

Riparian Management

The objective of riparian management in Utah is to establish an aggressive riparian area management program that will identify, maintain, restore, and/or improve riparian values to achieve a healthy and productive ecological condition for maximum long-term benefits in order to provide watershed protection while still preserving quality riparian dependent aquatic and terrestrial species habitats and, as appropriate, allow for reasonable resource uses. Priority for riparian area management will be given to areas identified as habitat for aquatic species with signed Conservation Agreements and Strategies.

Riparian area management is an integral part of all resources and related management programs. Management actions may include reductions in livestock numbers, adjustments in grazing distribution patterns, fencing, herding, livestock conversions, vegetation treatments, monitoring, and recontouring streambanks. In addition, restrictions are placed on other resource programs that are meant to protect riparian areas including, development restrictions on time, space, and placement, and appropriate buffers. Those activities that affect or are affected by riparian values will account for the riparian areas management objectives and direction. Resource values and uses that affect or are affected by riparian values include wildlife and fisheries habitat, forest resources, livestock grazing, OHV use, visual resources, cultural and historical resources, minerals exploration and development, lands and realty activities, watershed and soils resources, recreation uses, fire management, and access.

Soils and Watershed Resources

The objectives for the soil and watershed resources management program are to maintain and improve soil integrity, and long-term soil productivity through implementation of rangeland health standards and other soil protection measures, as well as to protect, maintain or improve surface and groundwater quality consistent with existing and anticipated uses and applicable state and federal water quality standards and to provide for availability of water to facilitate authorized uses.

Best Management Practices (BMPs) are incorporated into project level documents and are designed to reduce sedimentation and protect water quality. BMPs are also designed to benefit soil productivity by minimizing erosion. Examples of soil protection measures implemented under this program include seasonal or weather restrictions for use of heavy equipment on moist soils or slope limitations for mechanical harvest equipment. Soil protection measures are often identified in site-specific environmental analyses. Examples of water quality protection measures include identification of heavy sediment loads, monitoring and treating soil erosion, evaluating and restricting surface development, and monitoring water quality. Watershed management activities include some of these same activities through the evaluation of projects, application of seasonal closures, monitoring of public drinking water, and completion of groundwater studies. Some of the field activities involve the use of heavy machinery and hand tools to develop riparian/wetland exclosures and stream improvements. Management of water resources may include the imposition of restrictions on activities such as development, in order to maintain water, and watershed quality. Generally, the program provides information in support of other resource objectives and goals.

Generally, on-the-ground activities are carried out under other programs and their impacts are discussed in the appropriate sections. Restrictions may include but are not limited to the modification of construction design in order to accommodate the preservation of physical and biological soil integrity, timing restrictions to reduce impacts to soils, or use of sediment and salt reducing measures during construction activities. Activity plans will address site-specific problems and include monitoring for salt and sediment loading.

Special Designations

The following describes special designations, including Areas of Critical Environmental Concern (ACEC); Wild and Scenic Rivers (WSR); and Wilderness Resources which include Wilderness Study Areas (WSAs), and congressionally designated Wilderness.

Areas of Critical Environmental Concern (ACECs) - An ACEC is the principal BLM designation for public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes; or to protect life and safety from natural hazards. ACECs in the MFO include:

- ***Alkali Ridge (39,196 acres)*** – This ACEC would be managed to protect cultural resources. In the Proposed Plan, this area would be open for mineral leasing with controlled surface use and would be available for vegetation treatments, livestock grazing, and OHV use and woodland harvest limited to designated roads. Within the Alkali Ridge ACEC, there is the Alkali Ridge National Historic Landmark (2,146 acres). This area would be managed as unavailable for disposal of mineral materials, NSO for oil and gas leasing, no surface-disturbing vegetation treatments, and a Right of Way (ROW) avoidance area. All travel limited to designated routes, no campfires, and unavailable for private and/or commercial use of woodland products.
- ***Hovenweep (2,439 acres)*** - This ACEC would be managed to protect the important cultural and historic values. The area would also be managed as VRM III, available for mineral leasing with controlled surface use, available for livestock use, and available for watershed improvements and vegetation treatments. This area would be excluded from private or commercial use of woodland products, unavailable for disposal of mineral materials, and OHV use limited to designated roads/trails. There would be a Visual Emphasis Zone (880 acres) that surrounds the west, south, and east sides of Hovenweep National Monument and would be managed as NSO for mineral leasing, excluded from watershed and vegetative treatments, ROW avoidance area, and managed as VRM Class II. In the northern part of the ACEC is a Cajon Pond Emphasis Zone (one acre). It is a fenced exclusion area that would be open for mineral leasing with a controlled timing stipulation to protect shorebird and waterfowl courtship and nesting season. This area is also excluded from livestock use.
- ***Indian Creek (3,908 acres)*** - This ACEC would be managed for the scenic values as VRM I. The area would be open for mineral leasing subject to NSO, unavailable for disposal of mineral materials, available for livestock use, closed to OHV use, ROW avoidance area, and unavailable for use of woodland products.
- ***Lavender Mesa (649 acres)*** - This ACEC would be managed to protect the relict vegetation. The area would be managed as VRM II, it would be open to for oil and gas

leasing with NSO, and open to locatable mineral entry. In addition, this ACEC would be excluded from livestock grazing, wildlife habitat improvements, watershed control structures, and land treatments or other improvements, except for test plots and facilities necessary for study of the plant communities, and restoration/reclamation activities. This ACEC would be subject to conditional fire suppression, closed to OHV use, no campfires, ROW avoidance area, and excluded from surface disturbance by mechanized or motorized equipment.

- ***San Juan River (4,321 acres)*** – The San Juan River would be designated as a Scenic, Cultural, Wildlife, Natural System Processes, and Geologic Features ACEC and would be managed with the following prescriptions: available for oil and gas leasing subject to NSO, available for OHV use limited to designated routes, unavailable for private and/or commercial use of woodland products, available for livestock use October 1 – May 31 with a rest-rotation and/or deferred management system, available for watershed, range, and wildlife habitat improvements and vegetation treatments, and unavailable for mineral material disposal.
- ***Shay Canyon (119 acres)*** - This ACEC would be managed to protect its cultural values. The area would be managed as VRM II, with no surface-disturbing vegetation, wildlife, or watershed treatments/improvements, NSO for oil and gas, grazing restricted to trailing only, and closed to mineral materials disposal. In addition, hiking would be limited to designated routes, ROW avoidance area, closed to camping and campfires, and closed to private or commercial use of woodland products.
- ***Valley of the Gods (22,863)*** - This ACEC would be designated for its scenic values and managed as VRM I. The area would be available for livestock use and vegetation treatments, OHV use limited to designated roads and trails, ROW exclusion area, no campfires allowed, and unavailable for mineral leasing and disposal of mineral materials.
- ***Bridger Jack Mesa, Butler Wash North, Dark Canyon*** – Under the Proposed Plan, these areas would be managed as Wilderness Study Areas.
- ***Cedar Mesa*** - Under the Proposed Plan, this area would be managed as a SRMA (see Recreation).

Wild and Scenic Rivers - Congress designates rivers into the National Wild and Scenic Rivers system. These can include scenic, wildlife, fish, cultural and recreational values among others. Eligible/suitable rivers are given a tentative classification of wild, scenic, or recreational based upon the amount of disturbance within the river corridor. Both congressionally designated rivers and eligible/suitable segments are managed to protect the free-flowing nature of the river, the tentative classification, and the outstandingly remarkable values.

Colorado River - Segment 1 (352 acres) would not be suitable for designation into the NWSRS. Segment 2 (880 acres) would be designated as suitable with the classification of Scenic, and would be managed as VRM II, open to oil and gas leasing subject to NSO, ROW avoidance area, and motorized boat use would be allowed. Segment 3 (1,040 acres) would be designated as suitable Scenic, and would be managed as VRM I, unavailable for oil and gas leasing, closed to OHV use, recommended for withdrawal from mineral entry, ROW exclusion area, and motorized boat use would be allowed.

Dark Canyon (2,048 acres) – Designated as suitable with a classification of Wild, and managed as VRM I. This river would be closed to oil and gas leasing, closed to OHV use, and recommended for withdrawal from mineral entry.

San Juan River – Under the Proposed Plan, Segments 1-4 (5760 acres) would not be suitable for designation into the NWSRS. Segment 5 (2,768 acres) would be designated as suitable with the classification of Wild, and would be managed as VRM Class I, closed to oil and gas leasing, closed to OHV use, ROW exclusion area, and recommended for withdrawal from locatable mineral entry.

Wilderness Resources - There are two types of special designations in this category: wilderness study areas, and congressionally designated wilderness. In general this means that there can be no new permanent structures or new disturbance that would require reclamation in order for the area to appear natural. The lands are closed to mineral leasing. With very few exceptions, there can be no new permanent structures or new disturbance, and no motorized or mechanized transport. The lands are closed to mineral leasing and mineral location under the mining laws. Management actions include limiting visitor use, restoration of ecological integrity and functions, limit change in the landscape, and manage natural sound-scapes by prohibiting all motorized vehicles. The Monticello FO manages 13 WSAs: Mancos Mesa (51,440 acres), Grand Gulch ISA Complex (105,520 acres), Road Canyon (52,420 acres), Fish Creek Canyon (46,440 acres), Mule Canyon (5,990 acres), Cheesebox Canyon (15,410 acres), Dark Canyon ISA Complex (68,030 acres), Butler Wash (24,190 acres), Bridger Jack Mesa (5,290 acres), Indian Creek (6,970 acres), South Needles (160 acres), Squaw and Papoose Canyons (6,676 acres), and Cross Canyon (1,008 acres). This is a total of 389,444 acres as identified in the Statewide Report to Congress. All WSAs would be VRM I management class and are exclusion areas for ROWs.

Special Status Species Management

The objectives of the special status species program include maintenance of biological diversity of plant and animal (terrestrial and aquatic) species by supporting the State Division of Wildlife Resources' strategic plans for wildlife population objectives to the extent practical and consistent with BLM multiple-use management requirements. Another main objective includes the development of protective measures for federally listed species and other special status species that require special consideration under BLM policy.

In addition, the special status species management program often includes the enforcement of timing restrictions, completion of surveys, and development of conservation measures and best management practices for the mitigation of effects of development deemed to be discretionary actions of the BLM. Activities implemented under this program may include identification and enforcement of timing stipulations; completion of species surveys; and closure of areas containing sensitive species populations or habitat.

Travel Management

The objectives of the transportation management program include maintenance of access for public and administrative needs; establishment of a route system that contributes to protection of sensitive resources; accommodates a variety of uses and minimizes user conflicts; and coordination of OHV management.

Activities included under this program include planning and decision making for roads and road designations. Under the Proposed Plan, 0 acres would be open to OHV use, 1,388,191 acres would be limited to designated routes, and 393,895 acres would be closed to OHV use. The number of miles of designated roads on public lands within the Monticello PA consists of 873 miles of open B-Class roads, 1,947 miles of open D-Class roads, and 316 miles of closed D-Class roads.

Vegetation Management

Objectives of the vegetation resource management program are to maintain or improve the diversity of plant communities to support livestock needs, wildlife habitat, watershed protection, and acceptable visual resources. Vegetation treatments, (e.g., timber harvest, sagebrush spraying or burning, chaining, etc.) will be designed to meet overall resource management objectives, which include the protection of listed plant and animal species. The four types of vegetation control methods include chemical, biological, and mechanical, and cultural practices. Biological control can involve the use of weevils, beetles, or goats. Mechanical methods include dozing, cutting, chopping, and pulling. Cultural controls include education and public awareness campaigns, use of weed free forage, and changes in grazing practices to increase health and vigor of plant communities so that they are more resistant to invasion. Herbicides are often applied in situations where other means are not as effective or cost efficient. Depending on the site and circumstances, these methods can be used individually or in combination. Sagebrush control measures are also implemented by the BLM. These control methods may be chemical or mechanical. Fire is used to improve range forage production, wildlife habitat, timber stands, sale debris disposal, and to reduce hazardous fuel buildup.

Under the Proposed Action, seed gathering and plant collection would be permitted in all areas meeting Utah's Rangeland Health Standards. The spread of noxious, invasive, and non-native weed species would be controlled through implementation of the BLM weed management policies and action plans (BLM 1991 and 2006). Under the Proposed Plan, there would be up to 4,833 acres of vegetation treatments in fire Regime Condition Class III areas and other vegetation cover types per year in the Monticello PA.

Visual Resource Management

The objective of visual resource management (VRM) is to manage public lands in a manner that will protect the quality of the scenic (visual) values of the landscape. To accomplish this objective, BLM establishes visual resource management priorities while giving consideration to other resource values and uses. Visual resources are managed in accordance with objectives classes that have been assigned to all public lands in each FO.

All WSAs and Wild and Scenic River segments would be managed as VRM I or II. Limited and very limited management activities would be allowed in areas designated as VRM classes I or II. Short-term vegetation treatments, and other surface-disturbing activities designed to enhance native vegetation, would be allowed in VRM classes I or II areas.

In areas designated as VRM classes III or IV, changes to the landscape would be moderate or high. Most types of surface-disturbing activities and human visitation would be allowed in VRM

classes III or IV areas. Under the Proposed Plan, 685,245 acres would be subject to VRM class I or II restrictions, and 1,096,370 acres would be subject to VRM class III or IV restrictions.

Wildlife and Fisheries Resource Management

The BLM works closely with the UDWR to manage habitat for fish and wildlife (including big game, upland game, waterfowl, neo-tropical migratory birds, small mammals, amphibians, and reptiles) to achieve and maintain suitable habitat for desired population levels and distribution within the decision area. The UDWR is responsible for managing wildlife population levels; the BLM is responsible for managing wildlife and fisheries habitat in a condition that will support desired levels of species. The BLM works cooperatively with the UDWR to maintain and reestablish populations of native species that have used the historic range located within the planning area through habitat management and restoration.

Objectives of the fish and wildlife resource management program include maintenance of habitat quantity, quality, and connectivity to sustain diverse wildlife populations; maintenance and improvement of aquatic habitats to sustain diverse fisheries and aquatic populations; and conservation of migratory bird habitat as directed by Executive Order 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds) and the Migratory Bird Treaty Act and emphasize management of migratory birds listed on the USFWS current list of Birds of Conservation Concern and the Partners-in-Flight priority species.

Fish and Wildlife and Fisheries Management actions may include surveying; habitat monitoring; habitat and species inventories, habitat improvement, habitat restoration, water developments, riparian habitat improvements, etc., as well as development of habitat management plans.

The BLM develops stipulations and conservation measures to both protect and enhance wildlife and fisheries habitats. These stipulations and conservation measures may include such things as: recommending withdrawal of some areas from mineral entry; limiting access to specific areas by OHVs and pedestrians; and minimizing the impacts of surface development. The BLM may acquire crucial wildlife habitats or easements and conduct inventories of potential habitats for occurrences of threatened, endangered, and sensitive species or their habitat.

Woodlands Management

Woodlands management objectives are to maintain and enhance the health, productivity, sustainability, and biological diversity of forest and woodland ecosystems and to provide a balance of natural resource benefits and uses, including opportunities non-commercial harvest of forest and woodland products on a sustainable basis. The BLM manages forests for multiple uses, such as recreation, livestock grazing, wildlife habitat.

Under this alternative, all 841,936 acres would be available for woodland harvesting (i.e. collection of standing and downed trees). Within the areas open to harvesting, there would be 597,086 acres of actual woodland habitat that would be available.

Conservation Measures

As part of the proposed action, in order to minimize the effects of the above management programs, the Monticello BLM Field Office has committed to a variety of species-specific conservation measures and, in conjunction with USFWS, developed species-specific lease notices for leases permitted under the Minerals and Energy Program. For a complete listing of the BLM committed conservation measures, lease notices, and Best Management Practices (BMPs), please refer to Appendix A.

SPECIES ACCOUNTS, EFFECTS, AND CONCLUSIONS

The following section includes species-specific information pertaining to the status and distribution of each species, the environmental baseline, and programmatic-level effects of the proposed action.

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed State or Federal projects in the action area that have already undergone formal or early Section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation process.

“Effects of the action” refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, which will be added to the environmental baseline. Direct effects encompass the immediate, often obvious effect of the proposed action on a species or its habitat. Indirect effects are caused by, or result from the proposed action, are later in time, and are reasonably certain to occur. In contrast to direct effects, indirect effects may be more subtle, and may affect species’ populations and habitat quality over an extended period of time, long after RMP activities have been completed.

Interrelated actions are those that are part of a larger action and depend upon the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consultation. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Mexican spotted owl (*Strix occidentalis lucida*)

Status of the Species

Species / Critical Habitat Description

The Mexican spotted owl (*Strix occidentalis lucida*) is one of three subspecies of spotted owl recognized by the American Ornithologists' Union (AOU 1957:285). The other two subspecies are the northern (*S. o. caurina*) and the California spotted owl (*S. o. occidentalis*). The Mexican subspecies is geographically isolated from both the California and northern subspecies.

The spotted owl is mottled in appearance with irregular white and brown spots on its abdomen, back and head. Several thin white bands mark an otherwise brown tail. The spots of the Mexican spotted owl are larger and more numerous than in the other two subspecies, giving it a lighter appearance. *Strix occidentalis* translates as "owl of the west"; *lucida* means "light" or "bright." Unlike most owls, spotted owls have dark eyes.

Adult male and female spotted owls have similar plumage. However, the sexes can be identified by voice and size differentiation. Juveniles, subadults, and adults can be distinguished by plumage characteristics (Forsman 1981; Moen et al. 1991). Juvenile spotted owls (hatchling to approximately five months) have a downy appearance. Subadults (5 to 26 months) have pointed

rectrices with white tips (Forsman 1981, Moen et al. 1991). Rectrices of adult (>27 months) feathers have rounded, mottled tips.

Although the spotted owl is often referred to as a medium-sized owl, it ranks among the largest owls in North America. Of the 19 species of owls that occur in North America, only 4 are larger than the spotted owl (Johnsgard 1988). As a species, the spotted owl averages 41-48 cm (16-19 inches) long (Earhart and Johnson 1970), 107-114 cm (42-45 inches) across the spread wings (Walker 1974), and weighs 547-647 grams (19.5-23 ounces). These measures are expressed as ranges because, similar to other owl species, spotted owls exhibit reversed sexual dimorphism (i.e., females are larger than males).

Life History and Population Dynamics

Spotted owls have one of the lowest clutch sizes among North American owls (Johnsgard 1988); females lay one to three eggs, two being the most common. Mexican spotted owls breed sporadically and do not nest every year (Ganey 1988). In good years, most of the population will nest, whereas in other years only a small proportion of pairs will nest successfully (Fletcher and Hollis 1994).

Courtship begins in March and eggs are laid in late March or, more typically, early April. Incubation begins shortly after the first egg is laid, and is performed entirely by the female. Female spotted owls generally incubate for approximately 30 days. During incubation, the female leaves the nest only to defecate, regurgitate pellets, or receive prey delivered by the male, who does most or all of the foraging. The eggs usually hatch in early May (Ganey 1988). Females brood their young almost constantly, leaving their nests for only brief periods during the night. Nestling owls fledge from four to five weeks after hatching, from early to mid-June in most cases (Ganey 1988). Owlets often leave the nest before they can fly, simply jumping from the nest onto surrounding tree branches or the ground. Within a week after leaving the nest, most owlets can make short, clumsy flights. Three weeks after leaving the nest owlets can hold and tear up prey on their own, and by late July most have become proficient at pouncing on crawling insects (Forsman et al. 1984). The young depend on their parents for food during the summer and will eventually disperse out of the natal area in the fall. Reproductive output varies both spatially and temporally (White et al. 1995), but may be higher than the California and the Northern spotted owl (Verner et al. 1992, Thomas et al. 1993).

Forsman et al. (1976) described spotted owls as "perch and pounce" predators. They typically locate prey from an elevated perch by sight or sound, then pounce on the prey and capture it with their talons. Spotted owls have also been observed capturing flying prey such as birds and insects (Verner et al. 1992). Specific prey groups include: woodrats, mice, voles, rabbits, gophers, bats, birds, reptiles, and arthropods. Spotted owls dwelling in canyons of the Colorado Plateau take more woodrats, and fewer birds, than do spotted owls from other areas.

Mortality factors include predation, starvation, and accidents. Little is known about how disease and parasites contribute to mortality of spotted owls. Avian predators include great horned owls, northern goshawks, red-tailed hawks, and golden eagles. The extent of predation is unknown; however both juveniles and adults are preyed upon (Willey 1993). Starvation may result from low abundance or availability of prey. Most instances of starvation occurred from late fall

through winter when prey resources were reduced in abundance and availability (Willey 1993, Block and Ganey, unpub. data). Starvation may also predispose individuals to increased predation. Little data is available on frequency of accidents, and subsequent mortality. Instances of spotted owls being hit by cars have been documented. Owls may also collide with power lines or other obstacles (USFWS 1995).

Based on limited study information, annual survival rates of adult Mexican spotted owls is 0.8-0.9 and juvenile survival is 0.06-0.29 (USFWS 1995). Survival estimates may be biased low, but conclude higher survival of adults than juveniles. Available data is either insufficient or has not been analyzed to estimate population trends.

Status and Distribution

The Mexican spotted owl (*Strix occidentalis lucida*) was listed as a threatened species on March 16, 1993 (58 FR 14248). The primary threats to the species were cited as even-aged timber harvest and catastrophic wildfire, although grazing, recreation, and other land uses were also mentioned as possible factors influencing the Mexican spotted owl population. The Fish and Wildlife Service appointed the Mexican Spotted Owl Recovery Team in 1993, which produced the Recovery Plan for the Mexican Spotted Owl (Recovery Plan) in 1995 (USFWS 1995).

On August 31, 2004, the USFWS designated approximately 8.6 million acres of critical habitat for the Mexican spotted owl in Arizona, Colorado, New Mexico, and Utah, on Federal lands (69 FR 53181). There are approximately 447,988 acres of designated critical habitat in the planning area including habitat in the northwestern quarter of the field office boundary and a small portion in the southwest portion. However, not all of these acres contain the primary constituent characteristics essential to the conservation of the species. Some of the primary constituent elements for the Mexican spotted owl include: (1) cooler and often more humid conditions than the surrounding area, (2) clumps or stringers of trees and/or canyon walls with crevices, ledges or caves, (3) high percent of ground litter and woody debris, and (4) riparian or woody vegetation. The primary constituent elements related to forest structure include (1) a range of tree species, (2) a shade canopy created by the tree branches covering 40 percent or more of the ground, and (3) large dead trees with a trunk diameter of at least 12 inches (69 Federal Register 53181-5398).

The primary constituent elements of the critical habitat designation include those physical and biological features that support nesting, roosting, and foraging. Vegetation communities and structural attributes used by the owl vary across the range of the subspecies, but consist primarily of mixed conifer forests or canyons. The mixed-conifer, pine-oak communities and canyon habitat appear to be the most frequently used communities throughout most portions of the subspecies' range (Skaggs and Raitt 1988; Ganey and Balda 1989, 1994; Gutierrez and Rinkevich 1991; USFWS 1995). In Utah, owls utilize canyon habitats (Willey 1998).

Primary constituent elements related to critical habitat in Utah include one or more of the following: (1) presence of water (often providing cooler temperatures and higher humidity than the surrounding areas); (2) clumps or stringers of mixed conifer, pine-oak, pinyon-juniper, and/or riparian vegetation; (3) canyon walls containing crevices, ledges, or caves; and (4) high percent of ground litter and woody debris. The primary constituent elements provide a qualitative

description of those physical and biological features necessary to ensure the conservation of the owl in Utah (69 FR 53181).

Although the Mexican spotted owl's entire range covers a broad area of the southwestern United States and Mexico, the Mexican spotted owl does not occur uniformly throughout its range. Instead, it occurs in disjunct localities that correspond to isolated forested mountain systems, canyons, and in some cases steep, rocky canyon lands. Surveys have revealed that the species has an affinity for older uneven-aged forests but also is known to inhabit a physically diverse landscape in the southwestern United States and Mexico. Owls can be found in forested mountains and canyons from southern Utah and Colorado to the mountains of Arizona, New Mexico, western Texas, and into the mountains of northern and central Mexico.

Steep-walled rocky canyonlands provide typical owl habitat within the Utah portion of the Colorado Plateau Recovery Unit. Canyon habitat is used by owls for nesting, roosting, and foraging and includes landscapes dominated by vertical walled rocky cliffs within complex watersheds, including many tributary side canyons. Rock walls must include caves, ledges, and fracture zones that provide protection for nesting and roosting sites. Breeding sites are located below canyon rims; however, it is known that owls use areas outside of the canyons (i.e., rims and mesa tops). Owls nest and roost primarily on cliff faces using protected caves and ledges, and forage in canyon bottoms, on cliff faces and benches, and along canyon rims and adjacent lands. Although it is difficult to rely upon vegetation alone to identify canyon habitat, these areas frequently contain small clumps or stringers of mixed-conifer, ponderosa pine, pine-oak, pinyon-juniper, and/or riparian vegetation (69 FR 53181). Little is known about patterns of habitat use by foraging owls. Willey (1998) documented owl use in Utah to include canyon bottoms and adjacent rims.

Colorado Plateau canyon habitats in Utah are naturally discontinuous and may explain the patchy locations of owls in the region. A study conducted in Zion National Park found owls nesting and roosting in humid, narrow canyons with dense understories (Rinkevich 1991). These canyons provide large cliffs with escape cover to avoid predation, shaded roost sites to avoid high summer temperatures, patches of forest vegetation, and availability of suitable prey.

Historic population size estimates and range of the Mexican spotted owl are unknown; however present population size and distribution are thought to be similar (USFWS 1995). Ninety-one percent of known owls in 1990-1993 occurred on U.S. Forest Service lands, primarily in Arizona and New Mexico. It is unknown why there are fewer owls in Utah and Colorado, but that may be a function of habitat type. Total range wide population estimates are 1,176 to 2,352 owls (69FR 53181, August 31, 2004). Seamans et al. 1999 reported 10 percent or greater population declines and low survival rates in central Arizona and west-central New Mexico. Gutierrez et al. (2003) documented that the decline in New Mexico was continuing, whereas the decline in Arizona appeared to have stabilized. Wide population fluctuations may be common for Mexican spotted owls (Gutierrez et al. 2003).

Environmental Baseline

Status of the Species within the Action Area

Dr. David Willey and Dan Spotskey modeled Mexican spotted owl habitat based on vegetation type, slope, elevation, aspect, and other factors in 1997 and 2000 (Willey and Spotskey 1997, 2000). Both the 1997 model and the 2000 model are used within Utah to identify potential habitat. Any projects that occur within the modeled potential habitat should be field-verified for actual habitat suitability and, if appropriate, surveys according to protocol should be conducted to determine if Mexican spotted owls occupy the area. The Mexican spotted owl occurs in the eastern and southern thirds of Utah, including San Juan and Grand counties (UDWR 2003).

The Mexican Spotted Owl Recovery Plan was finalized in 1995. Six Recovery Units in the United States were identified based on similarities, or obvious dividing lines, between the following: physiographic provinces, biotic regimes, perceived threats to habitat or individual birds, administrative boundaries, and owl distribution. Suitable habitat and designated critical habitat on public lands managed by the BLM in Utah are within the Colorado Plateau Recovery Unit (USFWS 1995). Five critical habitat units have been delineated in Utah, including the following units which are located in or adjacent to the planning area:

- Unit CP-11.* This unit is located in Iron, Washington, and Kane Counties in southwest Utah, approximately 22 mi (35 km) northeast of St. George. About half of the unit is on BLM owned lands; Zion National Park is the other land owner.
- Unit CP-12.* This Unit is in the vicinity of the Kaiparowits Plateau and the Cockscomb, in Kane and Garfield Counties. This unit is primarily on the Grand Staircase-Escalante National Monument, which is owned and managed by the BLM. The other land owner is the Forest Service (Dixie National Forest).
- Unit CP-13.* This unit occurs in Wayne, Garfield, Kane, and San Juan Counties, Utah. It is primarily in the Waterpocket Fold landform extending to Lake Powell. The primary land owner in this Unit is the National Park Service (Capitol Reef National Park and Glen Canyon National Recreation Area). The BLM owns and manages lands within this unit primarily on the Grand Staircase-Escalante National Monument and along the eastern edge of the Unit. The Forest Service (Fishlake National Forest) also owns land, but to a much lesser extent.
- Unit CP-14.* This Unit lies in Wayne, Garfield, San Juan, and Grand Counties, Utah. It includes the Dark Canyon Primitive and Wilderness areas of the BLM and FS, respectively. This Unit has lands owned and managed by the National Park Service (Canyonlands National Park and Glen Canyon National Recreation Area), the BLM, and the Forest Service (Manti La-Sal National Forest).
- Unit CP-15.* This unit is located approximately 30 mi (48 km) east of Price, in Carbon and Emery Counties. Situated in the West Tavaputs Plateau, it is located largely along the Desolation Canyon area of the Green River. The BLM is the primary owner and manager of land within this unit.

It is important to note that critical habitat is not the only suitable or occupied habitat available for owls. Critical habitat is only a regulatory delineation of habitat meeting primary constituent elements, and was defined based largely on known localities of nest sites (Protected Activity Centers; PACs) at the time of designation. There is substantial suitable habitat that occurs outside of the designated critical habitat boundaries and these should be assessed using the models and field evaluations as previously described.

The Monticello planning area contains two MSO protected activity centers (PACs). PACs are areas (at least 600 acres in size) around a known nest or roost site in which minimal management is permitted. Owls may also occur in other areas within or near the planning area.

Designated critical habitat for this species occurs within the planning area. The USFWS designates critical habitat for threatened or endangered species to protect occupied habitat and to protect suitable but unoccupied habitat to allow for expansion of populations and recovery of the species. There are approximately 10,571 acres in Unit CP-13 and 437,417 acres in Unit CP-14 of designated critical habitat located within the planning area.

Factors Affecting Species Environment within the Action Area

Threats to this species and its habitat include recreation, grazing, oil and gas exploration and development, and road improvement and development within canyons; loss, fragmentation, or modification of habitat from catastrophic fire and timber harvest within upland forests potentially used for foraging, dispersal, and wintering; and increased predation associated with habitat fragmentation (USFWS 1995).

Effects of the Action

Cultural Resources Management

This program includes surveys, inventories, excavation activities, surface material collection, and interpretive site development. Surveys may involve multiple people and vehicles and can last up to several weeks. Inventories for cultural resources commonly entail the use of hand tools, power tools, or heavy machinery.

Activities occurring under this program may increase human presence; equipment and vehicle use; and surface disturbance in Mexican spotted owl habitat. Associated visual and noise disturbances may adversely affect the behavior of spotted owls during breeding, nesting, roosting, or foraging efforts. Vegetation disturbances or removal associated with cultural resources excavations may reduce availability of prey habitat and prey abundance, at least in the short term. As a result, there may be site-specific decreases in nest initiation or nesting success, and displacement. These effects are likely to be short-term and relatively small scale due to the type of activity.

Paleontological Resources Management

This program includes surveys, inventories, excavation activities, surface material collection, and interpretive site development. Surveys may involve multiple people and vehicles and can last up

to several weeks. Inventories for paleontological resources commonly entail the use of hand tools, power tools, or heavy machinery.

Activities occurring under this program may increase human presence; equipment and vehicle use; and surface disturbance in Mexican spotted owl habitat. Associated visual and noise disturbances may adversely affect the behavior of spotted owls during breeding, nesting, roosting, or foraging efforts. Vegetation disturbances or removal associated with paleontological resources excavations may reduce availability of prey habitat and prey abundance, at least in the short term. As a result, there may be site-specific decreases in nest initiation or nesting success, and displacement. These effects are likely to be short-term and relatively small scale due to the type of activity.

Fire Management

Objectives of fire management are to protect life, property, and resources values from wildfire and restore the natural role of fire in the ecosystem. Major activities associated with the BLM's fire management program include: wildfire suppression, wildland fire use, prescribed burning, non-fire fuels treatments (mechanical and chemical), and emergency stabilization and rehabilitation following wildfires. Fire suppression methods may involve: fireline construction, use of fire suppression agents and retardants, and water withdrawals.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; and surface disturbance; and decrease local air quality in Mexican spotted owl habitats. Associated visual and noise disturbances may adversely affect the behavior of Mexican spotted owls during breeding, nesting, roosting, or foraging activities. Vegetation disturbances or vegetation removal may decrease prey habitat and prey abundance. Soil disturbances and increased erosion may indirectly decrease abundance of prey. Localized effects from smoke may adversely affect owlets or displace owls. As a result of these impacts, there may be site-specific decreases in nest initiation or nesting success, increased potential for displacement, and increased owlet and adult mortality.

Potential impacts from wildland fire use and prescribed fire would be similar to those from wildfire suppression. Non-fire fuels treatments and emergency stabilization and rehabilitation following wildfires may be used to retain or improve range conditions and maintain lower fuel loads in grassland and sagebrush habitats. Negative short term impacts include harassment or displacement; or immediate post-project alteration of key prey habitat components from surface disturbance. Fire management activities could benefit prey populations of Mexican spotted owls in the long-term due to improved forage quality and quantity.

Health and Safety Management

Activities conducted under the health and safety program include providing warnings, securing and disposing of hazardous waste discharged on public lands, establishing precautions, and responding to emergencies. Activities may involve increased human presence, use of heavy equipment, and removal of contaminated soils. These activities have the potential to occur in locations where mineral development or transport occurs.

Mineral developments, pipelines, and roads occur within all of the planning areas analyzed in this document, and have some potential to occur in Mexican spotted owl habitat. Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; and surface disturbance in Mexican spotted owl habitat. Associated noise and visual disturbances may adversely affect the behavior of Mexican spotted owls during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may decrease the availability and quality of nesting habitat; decrease cover from predators and increase predation; and decrease the availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and adversely impact prey habitat. As a result, there may be decreases in nest initiation or nesting success, and decreased adult and owlet fitness.

Lands and Realty Management

Objectives of the lands and realty management program are to support multiple-use management goals of the BLM resource programs; respond to public requests for land use authorizations, sales, and exchanges; and acquire and designate rights of way access to serve administrative and public needs. Realty management authorizes occupancy of public lands for roads, power lines, pipelines, communication sites, and irrigation ditches authorized by granting rights of way. Rights of way management actions respond to public requests for access, land authorizations, sales, and exchanges. These rights of way may be temporary or extend up to 30 years, or even in perpetuity.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation disturbance; and surface disturbance in Mexican spotted owl habitat. Associated noise and visual disturbances may adversely affect the behavior of Mexican spotted owls during breeding, nesting, or foraging activities. Construction of power lines or other infrastructure may result in electrocutions, entanglements, or collisions with flying birds, resulting in possible mortality. Vegetation disturbances or vegetation removal may adversely affect availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and adversely affect prey habitat. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for Mexican spotted owl prey species. Exchange or sales of lands may lead to habitat fragmentation and loss. As a result, there may be decreases in nest initiation or nesting success, and decreased adult and owlet fitness.

Livestock Grazing Management

The objective of livestock grazing management is to maintain or improve forage production and range condition as a sustainable resource base for livestock grazing on BLM land. Livestock management includes designating the kind and class of livestock, seasons of use, locations of use and the numbers of livestock that are permitted to use BLM lands.

Range management activities may include vegetation treatments such as prescribed fire, mechanical and chemical control of noxious weeds, sagebrush and other target species. The determinations and effects analyses associated with the potential impacts of these treatments can be located under the other appropriate program headings (i.e., fire treatments – see Fire and Fuels Management, or vegetative treatments – see Vegetation Management). Other range

improvements authorized by the livestock grazing management program may include fence construction, water developments, exclosures, and livestock handling facilities.

There are four primary ways livestock manipulate habitats to favor/hinder wildlife species: 1) alteration of vegetation composition, 2) cause increased/decreased productivity of selected plant species, 3) increase/decrease the nutritive quality of available forage, and/or 4) increase/decrease the diversity of habitats by altering structure (Severson and Urness 1994).

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation disturbance; and minor surface disturbance in Mexican spotted owl habitat. Associated visual and noise disturbances may adversely affect the behavior of Mexican spotted owls during breeding, nesting, or foraging activities. Vegetation disturbances, vegetation removal, or vegetation alteration may result in less dense vegetation, more invasive plant species, fragmented prey habitat and adverse affects to availability of prey habitat and prey abundance. Soil disturbances may increase erosion, adversely affect soil stability, and adversely affect prey habitat. As a result, there may be decreases in nest initiation or nesting success, and increased adult and owlet mortality.

Minerals Management

The planning area will be open to consideration for exploration, leasing, and development of leasable minerals (oil, gas, coal, tar sands), salable minerals (sand, gravel, clay, and stone) and locatable materials (uranium, gold, copper, and limestone). Although stipulations or conditions may be included in the terms of these mineral contracts, there are potential impacts associated with these various activities. Mineral exploration and extraction often results in surface disturbance from road and facility construction, removal of topsoil and overburden, stock piling of these materials, and post-mining reclamation and recontouring.

These occurrences may increase human presence; equipment and vehicle use; vegetation disturbance or removal; soil disturbances; invasive plant species; and pollutants in Mexican spotted owl habitat. Associated noise and visual disturbances may adversely affect the behavior of Mexican spotted owls during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may adversely affect availability of quality and quantity of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and decrease prey habitat. Some ancillary equipment associated with energy development (e.g., transmission lines, oil pits) may result in direct mortality of owls if they become impinged on the lines or caught in the pits. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for Mexican spotted owl prey species. Pollutants in the area may affect Mexican spotted owls through adverse effects to prey populations. As a result of these impacts, there may be decreases in nest initiation or nesting success, and decreased adult or owlet fitness.

Recreation Management

The recreation program includes providing for and managing recreational access, developing and maintaining recreation areas, issuing special recreation permits, providing information to the public about recreational resources, and assessing effects of recreational use on the natural

resources. Under this program, OHV use, camping, rafting, hiking, fishing, boating, swimming, and other activities are allowed in designated areas.

Authorized activities under this program have the potential to increase human presence; equipment and vehicle use; vegetation disturbance; and surface disturbance in Mexican spotted owl habitat. Associated visual and noise disturbances may adversely affect the behavior of Mexican spotted owls during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may adversely affect the availability and quality of prey habitat and prey abundance. Soil disturbances may increase erosion, adversely affect soil stability, and adversely affect prey habitat. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for Mexican spotted owl prey species. As a result, there may be decreases in nest initiation or nesting success, and decreased adult and owlet fitness.

Riparian Management

The objective of riparian management in Utah is to establish an aggressive riparian area management program that will identify, maintain, restore, and/or improve riparian values to achieve a healthy and productive ecological condition for maximum long-term benefits in order to provide watershed protection while still preserving quality riparian dependent aquatic and terrestrial species habitats and, as appropriate, allow for reasonable resource uses. Priority for riparian area management will be given to areas identified as habitat for aquatic species with signed Conservation Agreements and Strategies.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), vegetation disturbance, and surface disturbance in Mexican spotted owl habitat. Associated noise disturbances may adversely affect the behavior of Mexican spotted owls during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may adversely affect availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and adversely affect prey habitat. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for Mexican spotted owl prey species. As a result, there may be decreases in nest initiation or nesting success, and decreased adult and owlet fitness.

Soils and Watershed Resources

The objectives for the soil and watershed resources management program are to maintain and improve soil integrity, and long-term soil productivity through implementation of rangeland health standards and other soil protection measures, as well as to protect, maintain or improve surface and groundwater quality consistent with existing and anticipated uses and applicable state and federal water quality standards and to provide for availability of water to facilitate authorized uses.

Potential adverse impacts to Mexican spotted owl suitable and designated critical habitat may result from land treatments occurring within watersheds. Many of these activities are meant to benefit soil resources and watersheds by reducing soil loss and reclaiming surface disturbances or unnecessary roads. However, activities occurring under this program may also increase human presence; equipment and vehicle use; vegetation manipulation; and surface disturbance in Mexican spotted owl habitat. Short-term adverse impacts may include, but not be limited to:

disruption of normal breeding, nesting, foraging, and roosting behaviors (associated with noise and visual disturbances); decreased nesting habitat; and decreased prey habitat. Long-term benefits may include increased nesting success, increased prey abundance, and increased survival.

Special Designations

This program is responsible for the management of special designated areas including Areas of Critical Environmental Concern (ACEC); Wild and Scenic Rivers (WSR); and Wilderness Resources which include Wilderness Study Areas (WSAs), and congressionally designated Wilderness. Generally, designation of an area results in implementation of conservation measures and timing stipulations that are beneficial to wildlife species.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), and surface disturbance in Mexican spotted owl habitat. Associated noise disturbances may adversely affect the behavior of Mexican spotted owls during breeding, nesting, or foraging activities. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits, and decrease prey habitat quality. Short-term, site-specific adverse impacts may include, but not be limited to: disruption of normal breeding, nesting, and foraging behaviors; decreased nesting success; and decreased insect prey habitat and prey abundance for Mexican spotted owls.

Travel Management

The objectives of the transportation management program include maintenance of access for public and administrative needs; establishment of a route system that contributes to protection of sensitive resources; accommodates a variety of uses and minimizes user conflicts; and coordination of OHV management.

Authorized activities under this program have the potential to increase human presence; equipment and vehicle use; vegetation disturbance; and surface disturbance in Mexican spotted owl habitat. Associated noise and visual disturbances may adversely affect the behavior of Mexican spotted owls during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may adversely affect the availability and quality of prey habitat and prey abundance. Soil disturbances may increase erosion, adversely affect soil stability, and adversely affect prey habitat. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for Mexican spotted owl prey species. As a result, there may be decreases in nest initiation or nesting success, and decreased adult and owlet fitness. There is some potential for owls to be killed in vehicle collisions on roadways.

Vegetation Management

Program objectives are to maintain or improve the diversity of plant communities to support timber production, livestock needs, wildlife habitat, watershed protection, and acceptable visual resources. Therefore, this program includes mechanical, chemical, biological, cultural vegetation management methodologies. These management methodologies may result in ground disturbing activities, chemical impacts, human disturbances, and impacts to vegetation from biological management techniques.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance (mechanical, chemical, biological); and surface disturbance in Mexican spotted owl habitat. Associated visual and noise disturbances may adversely affect the behavior of Mexican spotted owls during breeding, nesting, or foraging activities. Vegetation alteration, removal, or inadvertent chemical treatment may adversely affect availability and quality of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and adversely affect prey species habitat. As a result, there may be site-specific decreases in nest initiation or nesting success, and decreased owl fitness. Long-term benefits may include increased nesting success, increased prey abundance, and increased survival.

Wildlife and Fisheries Management

This program aims to maintain biological diversity, improve habitat for wildlife and fisheries, and provide habitats for threatened and endangered species.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; and surface disturbance in Mexican spotted owl habitat. Associated visual and noise disturbances may adversely affect the behavior of Mexican spotted owls during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may adversely affect availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, increase sediment deposits, and habitat for prey species. Short-term adverse impacts may include, but not be limited to: fragmentation of prey habitat; decreased nest initiation or nesting success; decreased adult and owlet fitness; and alterations of water distribution within occupied habitat of the Mexican spotted owl. In general, long-term efforts to improve the health of riparian habitats may benefit Mexican spotted owls by increasing prey abundance.

Woodlands Management

Woodlands management objectives are to maintain and enhance the health, productivity, sustainability, and biological diversity of forest and woodland ecosystems and to provide a balance of natural resource benefits and uses, including opportunities non-commercial harvest of forest and woodland products on a sustainable basis. The BLM manages forests for multiple uses, such as recreation, livestock grazing, wildlife habitat.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; and surface disturbance near or in Mexican spotted owl habitat. Associated visual and noise disturbances may adversely affect the behavior of Mexican spotted owls during breeding, nesting, or foraging activities. Vegetation disturbances, vegetation removal, or chemical treatment of vegetation may adversely affect prey habitat and prey availability, and therefore, adversely affect Mexican spotted owls and their young. Soil disturbances may increase erosion, adversely affect soil stability, and adversely affect prey habitat and prey abundance. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for Mexican spotted owl prey species. As a result, there may be decreases in nest initiation or nesting success, and decreased adult and owlet fitness.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

Cumulative effects to the Mexican spotted owl and designated critical habitat under the Proposed Actions would include, but are not limited to, the following broad types of impacts:

- Changes in land use patterns or practices that adversely affect a species' critical, suitable, or potential habitat.
- Encroachment of human development into a species' critical, suitable, or potential habitat.
- Fire management actions by some, or all, of the following groups, on lands adjoining or upstream of BLM-administered lands:
 - State of Utah
 - County Governments in Utah
 - Local Governments in Utah
 - Private landholders in Utah

Mexican spotted owls occur throughout the action area, generally as year-around residents (Ganey and Block 2005). In these areas, Mexican spotted owls locations are surrounded by a checkerboard pattern of land ownership including Federal, State, and private landowners. Mexican spotted owls are susceptible to activities on State and private lands. Many of these activities, such as livestock grazing, oil and gas exploration and development, human population expansion and associated infrastructure (increased trails and roads) development, research, and recreation activities (including OHV use and any activities that increase human presence), are expected to continue on State and private lands within the Mexican spotted owl's range. Contributing as cumulative effects to the proposed action, these activities will continue to affect Mexican spotted owls' productivity with disturbances to breeding, nesting, and foraging behaviors and further fragmenting habitat of prey populations.

Conclusion

The conclusions of this biological opinion are based on full implementation of the project as described in the "Description of the Proposed Action" section of this document, including the resource protection measures that were incorporated into the project design.

After reviewing the current status of the Mexican spotted owl and its critical habitat, the environmental baseline for the action area, the effects of the proposed project, and the cumulative effects, it is the Service's biological opinion that the Monticello BLM Field Office Resource Management Plan, as proposed, is not likely to jeopardize the continued existence of the Mexican spotted owl, and is not likely to destroy or adversely modify designated critical habitat. We base our conclusion on the following:

1. The applicant committed resource protection measures will be incorporated into site-specific projects designed under the BLM Resource Management Plan. If project design cannot adhere to all applicant committed resource protection measures, consultation under Section 7 of the Endangered Species Act will be initiated.
2. All site-specific projects designed under the proposed BLM Resource Management Plan would be subject to consultation requirements under Section 7 of the Endangered Species Act.

Southwestern willow flycatcher (*Empidonax traillii extimus*)

Status of Species

Species/Critical Habitat Description

The southwestern willow flycatcher (*Empidonax traillii extimus*) is a small passerine bird associated with riparian habitats and a subspecies of *Empidonax traillii*. This species was listed as endangered under the Endangered Species Act of 1973, as amended (ESA), on February 27, 1995 (USFWS 1995). On October 19, 2005, 120,824 acres of critical habitat were designated for southwestern willow flycatchers across Arizona, New Mexico, California, Nevada, and Utah (USFWS 2005). Within Utah, critical habitat was only designated along the Virgin River in Washington County, an area not part of this consultation. Therefore, there will not be any further mention of critical habitat for southwestern willow flycatchers in this consultation.

The southwestern willow flycatcher is a small bird, approximately 15 centimeters (cm) (5.75 inches) long. It has a grayish-green back and wings, whitish throat, light grey-olive breast, and pale yellowish belly. Two wing bars are visible; the eye ring is faint or absent. The upper mandible is dark, the lower is light. The southwestern willow flycatcher is one of four currently recognized subspecies of the willow flycatcher (*E. traillii*) (Hubbard 1987; Unitt 1987; Sogge 2000; USFWS 2001 and 2002). The *E. t. extimus* subspecies was first described by Phillips (1948) and later re-evaluated and accepted as a subspecies by Unitt (1987) and Browning (1993).

The *E. t. extimus* is paler than the other willow flycatcher subspecies and also differs in morphological characteristics: e.g., wing: tail ratio, wing formula; and bill length (Unitt 1987 and 1997; Browning 1993; USFWS 2001 and 2002). These differences are difficult to distinguish and are not reliable characteristics for field identification. The characteristic song of willow flycatcher species is often referred to as a "fitz-bew". Travis (1996) and Sedgwick (1998 and 2001) suggest that clinal variations in willow flycatcher songs also serve to distinguish between subspecies, but this too is unreliable as a definitive field identification tool. In southern Utah, southwestern Colorado, and perhaps New Mexico, clinal gradations of the *E. t. extimus* and Great Basin/Rocky Mountain willow flycatcher (*E. t. adastus*) are thought to occur (USFWS 2002). Phillips et al. (1964) suggested that the *E. t. extimus* may be typical of lower elevations, and in northern parts of its range (including Utah), clinal gradation with the Great Basin subspecies may exist with increasing elevation and latitude. Recent research (Paxton 2000) concluded that the *E. t. extimus* is genetically distinct from the other willow flycatcher species. However, clinal gradation increases the difficulty of subspecies identification without genetic testing.

Life History and Population Dynamics

Male southwestern willow flycatchers generally arrive at breeding grounds first, with females typically arriving a week or two later. Males are usually monogamous, but polygamy has been recorded (Sogge et al. 1997). Nests are usually built within a week of pair formation. Egg-laying begins as early as May but typically occurs in mid-June. The female provides initial care of the nestlings, the role of the male increases with the age and size of the young. Young typically fledge at 12 to 15 days of age, usually between June and mid-August. Second clutches are common if the first attempt is unsuccessful. Territory size varies among the southwestern willow flycatcher, probably due to differences in population density, habitat quality, and nesting stage.

Open, cup-shaped nests are typically constructed in the fork of a branch. Historically, most southwestern willow flycatcher nests (75-80%) were constructed in willows. Currently, the species nests in a variety of plant species, including exotic species such as tamarisk.

Information on breeding site fidelity and persistence is limited. Studies of banded birds (Whitfield and Strong 1995; Whitfield and Enos 1996) report varying rates of nestlings returning to study sites to breed. Sogge and Tibbits (1994) reported the return of breeding populations to sites that had been unoccupied for several years, indicating that a habitat cannot be assumed unsuitable or unoccupied in the long term based on absence of southwestern willow flycatchers during a single year.

The southwestern willow flycatcher breeds in different types of dense riparian habitats across a large elevational and geographic area. Although the other willow flycatcher subspecies may breed in shrubby habitats away from water, the southwestern willow flycatcher breeds in patchy to dense riparian habitats along streams or other wetlands, near or adjacent to surface water or underlain by saturated soil. Occupied southwestern willow flycatcher sites consist of dense vegetation in the patch interior that is generally 3 to 4 m (10 to 13 ft) above ground, or in aggregates of dense patches interspersed with openings. Saturated soil is present at or near the breeding site during wet or non-drought years (Sogge et al. 1997, Sogge and Marshall 2000, USFWS 2001 and 2002). Rangewide, common tree and shrub species comprising nesting habitat include willows (*Salix* spp.), seepwillow or mulefat (*Baccharis* spp.), box elder (*Acer negundo*), stinging nettle (*Urtica* spp.), blackberry (*Rubus* spp.) cottonwood (*Populus* spp.) arrowweed (*Tessaria sericea*), tamarisk or saltcedar (*Tamarix ramosissima*), and Russian olive (*Elaeagnus angustifolia*). Dominant plant species, size and shape of habitat patch, canopy structure, vegetation height, etc., vary widely across the *E. t. extimus*'s range. In Utah, the southwestern willow flycatcher is typically found in mixed native and exotic riparian species habitats, generally dominated by coyote willow, tamarisk and Russian olive (Johnson et al. 1999a and 1999b).

Little specific information is known about migration and wintering ecology of the southwestern willow flycatcher (Yong and Finch 1997, Finch et al. 2000). Willow flycatchers (all subspecies) breed in North America, but winter in Mexico, Central America, and possibly northern South America (Phillips 1948, Stiles and Skutch 1989, Ridgely and Tudor 1994, Howell and Webb 1995, Sogge et al. 1997).

Status and Distribution

The historical breeding range of the southwestern willow flycatcher included southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and extreme northwestern Mexico (Hubbard 1987; Unitt 1987; Browning 1993; USFWS 2002). The flycatcher's current range is similar to the historical range, but the quantity of suitable habitat within that range is much reduced from historical levels. The flycatcher occurs from near sea level to over 2600 m (8500 ft), but is primarily found in lower elevation riparian habitats (USFWS 2002). Throughout its range, the flycatcher's distribution follows that of its riparian habitat; relatively small, isolated, widely dispersed locales in a vast arid region (USFWS 2002). Surveys for the southwestern willow flycatcher have been conducted by the UDWR.

The Recovery Plan (USFWS 2002) divides the southwestern willow flycatcher's breeding range into six Recovery Units, which are subdivided into Management Units. Recovery Units are defined based on large watershed and hydrologic units; standardized boundaries of river basin units within the U.S. Within each of the six Recovery Units, multiple Management Units are delineated based on a geographic area representing all or part of a surface drainage basin, a combination of drainage basins, or a distinct hydrologic feature. The outer limits of both the Recovery Unit and Management Unit boundaries are defined by the southwestern willow flycatchers' range (USFWS 2001 and 2002).

The State of Utah falls within the Lower Colorado and Upper Colorado Recovery Units. The Upper Colorado Recovery Unit covers much of the four-corners area of southern Utah, southwestern Colorado, northeastern Arizona, and northwestern New Mexico. The northern boundary of the Upper Colorado Recovery Unit is delineated by the northern range boundary of the southwestern willow flycatcher. Ecologically, this region may be an area of clinal gradation between the southwestern willow flycatcher and the Great Basin willow flycatcher. The Lower Colorado Recovery Unit is a geographically large and ecologically diverse Recovery Unit, encompassing the Colorado River and its major tributaries, from Glen Canyon Dam downstream to the Mexico border (USFWS 2001 and 2002).

As previously discussed, recent genetic work (Paxton 2000) verified *E. t. extimus* genetic stock in the San Luis Valley of south-central Colorado and the Virgin River in Utah. Paxton's (2000; as cited in USFWS 2002) research showed that the northern boundary for southwestern willow flycatchers was generally consistent with that proposed by Unitt (1987) and Browning (1993), and subsequently used in the Final Recovery Plan (USFWS 2002). Paxton's (2000) research further illustrated that the willow flycatcher in central Utah does not have the genetic markers of *E. t. extimus* and is more closely related to *E. t. adastus*. However, because of the absence of flycatchers in the lower- to mid-elevations of the Colorado Plateau in southern Utah and southwestern Colorado, Paxton (2000; as cited in USFWS 2002) did not address potential sub-specific differences resulting from elevation or habitat differences and watershed boundaries. Analysis of willow flycatcher vocalizations in central Utah also suggests association with *E. t. adastus*. The Final Recovery Plan (USFWS 2002) adopts a range boundary that reflects Paxton's (2000) and Sedgwick's (2001) results; the northern extent of southwestern willow flycatchers is confined to the southern portions of Utah. In the Recovery Plan, the USFWS acknowledges that new data may result in refinements to the northern range boundary currently

recognized (USFWS 2002). This is based on the limited genetic information in portions of central and eastern Utah, particularly along major drainages including the Colorado and Green Rivers. Therefore, the USFWS Utah Field Office considers potential distribution for southwestern willow flycatchers to possibly extend further north than the Recovery Plan boundary.

The reasons for the decline of the southwestern willow flycatcher and current threats to its conservation are numerous, complex and inter-related (USFWS 2001, 2002). The major factors threatening the species include habitat loss and modification; invasion of breeding habitats by exotic plant species; brood parasitism by brown-headed cowbirds; the vulnerability of small southwestern willow flycatcher population numbers; and stresses that occur to the species during migration and in wintering habitats. These factors vary in severity over the southwestern willow flycatcher's range, and several are likely to have cumulative and synergistic effects (USFWS 1997).

For more information regarding the life history and population dynamics, see the Final Recovery Plan for the southwestern willow flycatcher (USFWS 2002).

Environmental Baseline

Status of the Species within the Action Area

The north-central limit of breeding southwestern willow flycatchers is in southern and possibly central Utah. *E. t. extimus* may have always been rare in these areas (Behle pers. comm. cited in Unitt 1987). However where habitat existed along the Colorado River and its tributaries in southeastern Utah, it was thought to be a locally common breeding and migratory resident (Behle and Higgins 1959). Few data are available on population trends in southern Utah. However, loss and modification of habitat is likely to have reduced populations on the Virgin, Colorado, and San Juan Rivers. These losses have been due to suburban expansion and habitat changes along the Virgin River, inundation by Lake Powell on the Colorado and San Juan Rivers, and encroachment of tamarisk throughout the region (Unitt 1987; BLM unpublished data).

Historically, the southwestern willow flycatcher occurred in the following river systems: Colorado, Monticello Creek, San Juan, Virgin, and perhaps Paria (Phillips 1948, Behle et al. 1958, Behle and Higgins 1959, Wauer and Carter 1965, Behle 1985, Browning 1993, USFWS 2002).

Suitable habitat or potentially suitable habitat exists for the flycatcher in larger riparian areas throughout the Monticello Planning Area. Southwestern willow flycatchers are known to use the planning area during migration. Birds have been documented migrating along the San Juan River, in Comb Wash, and within the Cross Canyon area. There is some potential that nesting has occurred in the Cross Canyon area; however this is unsubstantiated. Other than the potential in Cross Canyon, no nesting populations of the southwestern willow flycatcher are known to occur in the action area, however it does contain suitable habitat for nesting (Johnson 2004, UDWR 2007).

Factors Affecting Species Environment within the Action Area

Where habitat existed along the Colorado River and its tributaries in southeastern Utah, it was thought to be a locally common breeding and migratory resident (Behle and Higgins 1959). Recent surveys conducted by Sogge et al. (2003) and Durst et al. (2005) have found a few breeding locations and territories in southern Utah. Little population trend data are available in Utah. However, loss and modification of habitat is likely to have reduced populations on the Colorado and San Juan Rivers.

The main threats to the species have been attributed to loss, modification, and fragmentation of riparian breeding habitat, loss of wintering habitat, and brood parasitism by the brown-headed cowbird (Whitfield 1990; Sferra et al. 1995; Sogge et al. 1997; McCarthey et al. 1998; USFWS 2002). The southwestern willow flycatcher and its habitat are threatened by urban, recreational, and agricultural development, water diversion and groundwater pumping, channelization, dams, and livestock grazing (USFWS 2002). Fire is an increasing threat to southwestern willow flycatcher habitat (Paxton et al. 1996), especially in monotypic salt cedar vegetation (DeLoach 1991) and where water diversions and/or groundwater pumping desiccates riparian vegetation (Sogge et al. 1997).

Floodplains and associated riparian vegetation were once dominated by a wide band of trees, principally cottonwood and willows (Horton 1977). Arrowweed and mesquite were dominant in many upland areas (Horton 1977). Graf (1982) reports that tamarisk was introduced into the United States in the early 1800s and into the American Southwest by 1856. From 1925 through 1960, tamarisk rapidly spread throughout Utah with the greatest degree of invasion occurring from 1935 to 1955 (Christensen 1962). Tamarisk changes channel morphology from braided, shallow systems to ones that are constrained, centralized, and deeper. Dense tamarisk vegetation reduces the channel capacities of normal flow events and has been cited as the cause of disastrous flooding (Graf 1982). Southwestern willow flycatcher habitat may be very vulnerable to the changes tamarisk invasion brings about in stream morphology and ecology. The effects of tamarisk to breeding southwestern willow flycatchers may not be as apparent as the effects to their habitat. Owen and Sogge (2002) studied 12 parameters of physiological condition of 130 southwestern willow flycatchers in native vegetation and tamarisk and found no evidence that flycatchers breeding in tamarisk exhibit poorer nutritional condition or are suffering negative physiological affects. However, breeding success and the number of species supported within a tamarisk stand is reduced (Anderson et al. 1977).

Effects of the Action

Cultural Resources

This program includes surveys, inventories, excavation activities, surface material collection, and interpretive site development. Surveys may involve multiple people and vehicles and can last up to several weeks. Inventories for cultural resources commonly entail the use of hand tools, power tools, or heavy machinery.

Activities occurring under this program may increase human presence; equipment and vehicle use; and surface disturbance in southwestern willow flycatcher habitat. Associated noise and visual disturbances may adversely affect the behavior of southwestern willow flycatchers during

breeding, nesting, or foraging efforts. Vegetation disturbances or removal may decrease the availability of nesting habitat; decrease cover from predators and increase predation; and decrease the availability of prey habitat. As a result, there may be decreases in nest initiation or nesting success. There is some potential for vegetation removal to result in nestling mortality.

Paleontological Resources

This program includes surveys, inventories, excavation activities, surface material collection, and interpretive site development. Surveys may involve multiple people and vehicles and can last up to several weeks. Inventories for paleontological resources commonly entail the use of hand tools, power tools, or heavy machinery.

Activities occurring under this program may increase human presence; equipment and vehicle use; and surface disturbance in southwestern willow flycatcher habitat. Associated noise and visual disturbances may adversely affect the behavior of southwestern willow flycatchers during breeding, nesting, or foraging efforts. Vegetation disturbances or removal may decrease the availability of nesting habitat; decrease cover from predators and increase predation; and decrease the availability of prey habitat. As a result, there may be decreases in nest initiation or nesting success. There is some potential for vegetation removal to result in nestling mortality; however implementation of the applicant committed conservation measures should greatly minimize this potential.

Fire Management

Objectives of fire management are to protect life, property, and resources values from wildfire and restore the natural role of fire in the ecosystem. Major activities associated with the fire management program include: wildfire suppression, wildland fire use, prescribed burning, non-fire fuels treatments (mechanical and chemical), and emergency stabilization and rehabilitation following wildfires. Fire suppression methods may involve fireline construction, use of fire suppression agents and retardants, and water withdrawals.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; and surface disturbance in southwestern willow flycatcher habitat. Associated noise and visual disturbances may adversely affect the behavior of southwestern willow flycatchers during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal decrease availability of nesting habitat; decrease cover from predators and increase predation; and decrease prey habitat. As a result, there may be decreases in nest initiation or nesting success, and decreased adult or nestling/fledgling fitness. There is some potential for fire management activities to result in adult or nestling mortality; however implementation of the applicant committed conservation measures should greatly minimize this potential.

Potential impacts from wildland fire use and prescribed fire would be similar to those from wildfire suppression. Non-fire fuels treatments and emergency stabilization and rehabilitation following wildfires may be used to retain or improve range conditions and maintain lower fuel loads in grassland and sagebrush habitats. Negative impacts include harassment or displacement; or immediate post-project alteration of adjacent habitat from surface disturbance.

Long-term benefits of this program, as vegetation is reestablished, may include increased nesting success, increased insect prey abundance, and decreased predation.

Health and Safety Management

The primary objective of health and safety management is to protect public and environmental health and safety on lands administered by BLM. Hazardous materials and waste management policies are integrated into all BLM programs. Several federal, state, and local laws overlap in their requirement of BLM to identify and remediate contaminated sites on public lands. Besides managing pre-existing contamination, BLM seeks to prevent or minimize contamination caused by BLM authorized actions.

Activities conducted under the health and safety program include providing warnings, securing and disposing of hazardous waste discharged on public lands, establishing precautions, and responding to emergencies. Activities may involve increased human presence, use of heavy equipment, and removal of contaminated soils. These activities have the potential to occur in locations where mineral development or transport occurs.

Mineral developments, pipelines, roads, and railroad transportation systems occur within all of the planning areas analyzed in this document, and have the potential to occur in southwestern willow flycatcher habitat. Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; and surface disturbance in southwestern willow flycatcher habitat. Associated noise and visual disturbances may adversely affect the behavior of southwestern willow flycatchers during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may decrease the availability and quality of nesting habitat; decrease cover from predators and increase predation; and decrease the availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. As a result of these impacts, there may be decreases in nest initiation or nesting success, and decreased adult and nestling/fledgling fitness. There is some potential for vegetation removal to result in nestling mortality; however implementation of the applicant committed conservation measures should greatly minimize this potential.

Lands and Realty Management

Objectives of the lands and realty management program are to support multiple-use management goals of the BLM resource programs; respond to public requests for land use authorizations, sales, and exchanges; and acquire and designate rights of way access to serve administrative and public needs. Realty management authorizes occupancy of public lands for roads, power lines, pipelines, communication sites, and irrigation ditches authorized by granting rights of way. Rights of way management actions respond to public requests for access, land authorizations, sales, and exchanges. These rights of way may be temporary or extend up to 30 years, or even in perpetuity.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), vegetation disturbance, and surface disturbance in southwestern willow flycatcher habitat. Associated noise disturbances may adversely affect the behavior of southwestern willow flycatchers during breeding, nesting, or foraging activities.

Vegetation disturbances or vegetation removal may decrease the availability and quality of nesting habitat; decrease cover from predators and increase predation; and decrease the availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for southwestern willow flycatchers and their prey species. Exchange or sales of lands may lead to fragmentation and loss of the species suitable habitat. As a result, there may be decreases in nest initiation or nesting success, and decreased adult and nestling fitness. There is some potential for activities authorized under this program to result in bird mortality; however implementation of the applicant committed conservation measures should greatly minimize this potential.

Livestock Grazing Management

The objective of livestock grazing management is to maintain or improve forage production and range condition as a sustainable resource base for livestock grazing on BLM land. Livestock management includes designating the kind and class of livestock, seasons of use, locations of use and the numbers of livestock that are permitted to use BLM lands.

Range management activities may include vegetation treatments such as prescribed fire, mechanical and chemical control of noxious weeds, sagebrush and other target species. The determinations and effects analyses associated with the potential impacts of these treatments can be located under the other appropriate program headings (i.e., fire treatments – see Fire Management, or vegetative treatments – see Vegetation Management). Other range improvements authorized by the livestock grazing management program may include fence construction, water developments, exclosures, and livestock handling facilities.

There are four primary ways livestock manipulate habitats to favor/hinder some wildlife species: 1) alteration of vegetation composition, 2) cause increased/decreased productivity of selected plant species, 3) increase/decrease the nutritive quality of available forage, and/or 4) increase/decrease the diversity of habitats by altering structure (Severson and Urness 1994).

Activities occurring under this program may increase human presence; vegetation disturbance; and minor surface disturbance in southwestern willow flycatcher habitat. Associated noise and visual disturbances may adversely affect the behavior of southwestern willow flycatchers during breeding, nesting, or foraging activities. Vegetation disturbances, vegetation removal, or vegetation alteration may result in less dense vegetation; an increase in invasive plant species; increased fragmented habitat; reduced availability of nesting habitat; decreased cover from predators and increased predation; and decreased availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. As a result, there may be decreases in nest initiation or nesting success, and decreased adult or nestling/fledgling fitness. There is some potential for vegetation removal, particularly prescribed fire, to result in nestling or adult mortality; however implementation of the applicant committed conservation measures should minimize this potential.

Minerals Management

The planning area will be open to consideration for exploration, leasing, and development of leasable minerals (oil, gas, coal, tar sands), salable minerals (sand, gravel, clay, and stone) and

locatable materials (uranium, gold, copper, and limestone). Although stipulations or conditions may be included in the terms of these mineral contracts, there are potential impacts associated with these various activities. Mineral exploration and extraction often results in surface disturbance from road and facility construction, removal of topsoil and overburden, stock piling of these materials, and post-mining reclamation and recontouring.

Activities occurring under this program may increase human presence; equipment and vehicle use; surface disturbance; and increased occurrence of chemical leaks in southwestern willow flycatcher habitat. Associated noise and visual disturbances may adversely affect the behavior of southwestern willow flycatchers during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may decrease the availability and quality of nesting habitat; decrease cover from predators and increase predation; and decrease the availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for southwestern willow flycatcher and their prey species. Pollutants in the area may affect southwestern willow flycatchers, prey populations, and vegetation. As a result of these impacts, there may be decreases in nest initiation or nesting success and decreased adult and nestling/fledgling fitness. There is some potential for vegetation removal to result in nestling mortality; however implementation of the applicant committed conservation measures should greatly minimize this potential. Ancillary facilities such as oil pits may result in direct mortality of birds if they forage over or become trapped in the pits.

Recreation Management

The recreation program includes providing for and managing recreational access, developing and maintaining recreation areas, issuing special recreation permits, providing information to the public about BLM's recreational resources, and assessing effects of recreational use on the natural resources. Under this program, OHV use, camping, rafting, hiking, fishing, boating, swimming, and other activities are allowed in designated areas.

Authorized activities under this program have the potential to increase human presence; equipment and vehicle use; vegetation disturbance; and surface disturbance in southwestern willow flycatcher habitat. Associated noise and visual disturbances may adversely affect the behavior of southwestern willow flycatchers during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may decrease the availability and quality of nesting habitat; decrease cover from predators and increase predation; and decrease the availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for southwestern willow flycatchers and their prey species. As a result, there may be decreases in nest initiation or nesting success, and decreased adult or nestling/fledgling fitness. There is some potential for vegetation removal to result in nestling mortality; however implementation of the applicant committed conservation measures should greatly minimize this potential.

Riparian Management

The objective of riparian management in Utah is to establish an aggressive riparian area management program that will identify, maintain, restore, and/or improve riparian values to

achieve a healthy and productive ecological condition for maximum long-term benefits in order to provide watershed protection while still preserving quality riparian dependent aquatic and terrestrial species habitats and, as appropriate, allow for reasonable resource uses. Priority for riparian area management will be given to areas identified as habitat for aquatic species with signed Conservation Agreements and Strategies.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), vegetation treatment or disturbance (mechanical, chemical, biological), and surface disturbance in southwestern willow flycatcher habitat. Associated noise disturbances may adversely affect the behavior of southwestern willow flycatchers during breeding, nesting, or foraging activities. Vegetation alteration, removal, or inadvertent chemical treatment may adversely affect availability and quality of nesting habitat; decrease cover from predators and increase predation; and decrease insect prey populations. Soil disturbances may increase erosion, adversely affect soil stability, increase sediment deposits, and alter channel morphology. There is some potential for vegetation removal to result in nestling or adult mortality; however implementation of the applicant committed conservation measures should greatly minimize this potential. There may also be decreases in nest initiation or nesting success, and decreased adult and nestling fitness. Long-term benefits may include: increased nesting success, increased insect prey abundance, and decreased predation.

Soils and Watershed Resources

The objectives for the soil and watershed resources management program are to maintain and improve soil integrity, and long-term soil productivity through implementation of rangeland health standards and other soil protection measures, as well as to protect, maintain or improve surface and groundwater quality consistent with existing and anticipated uses and applicable state and federal water quality standards and to provide for availability of water to facilitate authorized uses.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation manipulation; stream alteration; and minor surface disturbance in southwestern willow flycatcher habitat. Short-term adverse impacts may include, but not be limited to: disruption of normal breeding, nesting, and foraging behaviors (associated with noise and visual disturbances); decreased nesting habitat; decreased cover from predators and increased predation; insect prey habitat; and alterations of water distribution within occupied habitat for southwestern willow flycatchers. There is some potential that work in riparian areas could result in mortality of nestlings; however implementation of the applicant committed conservation measures should greatly minimize this potential. Long-term benefits may include: increased nesting success, increased insect prey abundance, and decreased predation.

Special Designations

This program is responsible for the management of special designated areas including Areas of Critical Environmental Concern (ACEC); Wild and Scenic Rivers (WSR); and Wilderness Resources which include Wilderness Study Areas (WSAs), and congressionally designated Wilderness. Generally, designation of an area results in implementation of conservation measures and timing stipulations that are beneficial to wildlife species.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), vegetation treatment or disturbance (mechanical, chemical, biological), and surface disturbance in southwestern willow flycatcher habitat. Associated noise disturbances may adversely affect the behavior of southwestern willow flycatchers during breeding, nesting, or foraging activities. Vegetation alteration, removal, or inadvertent chemical treatment may adversely affect availability and quality of nesting habitat; decrease cover from predators and increase predation; and decrease insect prey populations. Soil disturbances may increase erosion, adversely affect soil stability, increase sediment deposits, and alter channel morphology. There is some potential for vegetation removal to result in nestling mortality; however implementation of the applicant committed conservation measures should greatly minimize this potential. There may also be decreases in nest initiation or nesting success, and decreased adult and nestling fitness. Long-term benefits may include: increased nesting success, increased insect prey abundance, and decreased predation.

Special Status Species Management

Objectives of the special status species program include maintenance of biological diversity of plant and animal (terrestrial and aquatic) species by supporting the State Division of Wildlife Resources' strategic plans for wildlife population objectives to the extent practical and consistent with BLM multiple-use management requirements. Other objectives include the development of protective measures for federally listed species and other special status species; cooperation with other agencies in managing listed species; facilitation of scientific research of special status species and their habitats; and to the extent possible, avoidance of habitat fragmentation.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance (mechanical, chemical, biological); and surface disturbance in southwestern willow flycatcher habitat. Associated noise and visual disturbances may adversely affect the behavior of southwestern willow flycatchers during breeding, nesting, or foraging activities. Vegetation alteration, removal, or inadvertent chemical treatment may adversely affect availability and quality of nesting habitat; decrease cover from predators and increase predation; and decrease insect prey populations. Soil disturbances may increase erosion, adversely affect soil stability, increase sediment deposits, and alter channel morphology. As a result, there may be decreases in nest initiation or nesting success, and decreased adult or nestling/fledgling fitness. There is some potential for vegetation removal to result in nestling mortality; however implementation of the applicant committed conservation measures should greatly minimize this potential. Long-term benefits may include: increased nesting success, increased insect prey abundance, and decreased predation.

Travel Management

The objectives of the transportation management program include maintenance of access for public and administrative needs; establishment of a route system that contributes to protection of sensitive resources; accommodates a variety of uses and minimizes user conflicts; and coordination of OHV management.

Activities occurring under this program may increase human presence; equipment and vehicle use; surface disturbance; and increased occurrence of chemical leaks in southwestern willow flycatcher habitat. Associated noise and visual disturbances may adversely affect the behavior of

southwestern willow flycatchers during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may decrease the availability and quality of nesting habitat; decrease cover from predators and increase predation; and decrease the availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for southwestern willow flycatcher and their prey species. As a result of these impacts, there may be decreases in nest initiation or nesting success, and decreased adult and nestling/fledgling fitness. There is some potential for vegetation removal to result in nestling mortality; however implementation of the applicant committed conservation measures should greatly minimize this potential.

Vegetation Resources

Program objectives are to maintain or improve the diversity of plant communities to support timber production, livestock needs, wildlife habitat, watershed protection, and acceptable visual resources. Therefore, this program includes mechanical, chemical, biological, cultural vegetation management methodologies. These management methodologies may result in ground disturbing activities, chemical impacts, human disturbances, and impacts to vegetation from biological management techniques.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance (mechanical, chemical, biological); and surface disturbance in southwestern willow flycatcher habitat. Associated noise and visual disturbances may adversely affect the behavior of southwestern willow flycatchers during breeding, nesting, or foraging activities. Vegetation alteration, removal, or inadvertent chemical treatment may adversely affect availability and quality of nesting habitat; decrease cover from predators and increase predation; and decrease insect prey populations. Release of biological control agents may have site-specific and wide ranging effects that may need to be further considered (refer to the Reinitiation Section of this BO) dependent in part on the release organism, e.g., salt cedar leaf beetle. Soil disturbances may increase erosion, adversely affect soil stability, increase sediment deposits, and alter channel morphology. As a result, there may be decreases in nest initiation or nesting success, and decreased adult and nestling/fledgling fitness. There is some potential for vegetation removal to result in nestling mortality; however implementation of the applicant committed conservation measures should greatly minimize this potential. Long-term benefits may include: increased nesting success, increased insect prey abundance, and decreased predation.

Wildlife and Fisheries Management

This program aims to maintain biological diversity, improve habitat on for wildlife and fisheries, and provide habitats for threatened and endangered species.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; and surface disturbance in southwestern willow flycatcher habitat. Associated noise and visual disturbances may adversely affect the behavior of southwestern willow flycatchers during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may adversely affect availability of nesting habitat, cover from predators, and insect prey habitat. Soil disturbances may increase erosion, adversely affect

soil stability, and increase sediment deposits. Short-term adverse impacts may include, but not be limited to: disruption of normal breeding, nesting, foraging, and roosting behaviors; decreased nesting habitat; decreased cover from predators and increased predation; decreased insect prey habitat; and alterations of water distribution within occupied habitat for southwestern willow flycatchers. There is some potential for vegetation removal to result in nestling mortality; however implementation of the applicant committed conservation measures should greatly minimize this potential. In some cases, management activities beneficial for one species may be detrimental to another species. In general, long-term efforts to improve the health of riparian habitats may benefit southwestern willow flycatchers by increasing nesting success, increasing insect prey abundance, and decreasing predation.

Woodlands Management

Woodlands management objectives are to maintain and enhance the health, productivity, sustainability, and biological diversity of forest and woodland ecosystems and to provide a balance of natural resource benefits and uses, including opportunities non-commercial harvest of forest and woodland products on a sustainable basis. The BLM manages forests for multiple uses, such as recreation, livestock grazing, wildlife habitat.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; and surface disturbance in southwestern willow flycatcher habitat. Associated noise and visual disturbances may adversely affect the behavior of southwestern willow flycatchers during breeding, nesting, or foraging activities. Vegetation disturbances, vegetation removal, or chemical treatment of vegetation decrease availability of nesting habitat; decrease cover from predators and increase predation; and decrease prey populations and prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for southwestern willow flycatchers and their prey species. As a result, there may be decreases in nest initiation or nesting success, and decreased adult fitness. There is some potential for vegetation removal to result in nestling mortality; however implementation of the applicant committed conservation measures should greatly minimize this potential.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

Cumulative effects to federally protected southwestern willow flycatchers under the Proposed Actions would include, but are not limited to, the following broad types of impacts:

- Changes in land use patterns or practices that adversely affect a species' suitable or potential habitat.
- Encroachment of human development into a species' suitable or potential habitat.

- Fire management actions by some, or all, of the following groups, on lands adjoining or upstream of BLM-administered lands:
 - State of Utah
 - County Governments in Utah
 - Local Governments in Utah
 - Private landholders in Utah

Few southwestern willow flycatcher breeding sites and territories have been found in Utah. However, potential and suitable habitat occurs within the jurisdictional management boundaries of BLM in the Monticello Field Office area. In these areas, southwestern willow flycatcher habitat areas are surrounded by a checkerboard pattern of land ownership including Federal, State, and private landowners. Southwestern willow flycatchers are susceptible to activities on State and private lands. Many of these activities, such as urban growth and development; construction and operation of dams along major waterways; water retention, diversion, or dewatering of springs, wetlands, or streams; recreation; road construction; fuels-reduction treatments; research; grazing activities (including alteration or clearing of native habitats for domestic animals); oil and gas exploration and development; introduction of non-native plant or wildlife species (which can alter native habitats and alter prey populations); and other associated actions. Increases or changes in cowbird foraging areas (construction of corrals, grazing of domestic stock, placement of bird feeders) and habitat fragmentation may increase the parasitism rate and decrease southwestern willow flycatcher reproduction. Continued and future conversion of floodplain and near shore lands will likely eliminate opportunities to restore floodplains to develop willow flycatcher habitat. Increased recreation, camping, off-road vehicle use, and river trips may harass and disturb breeding birds or impact nesting habitats. Contributing as cumulative effects to the proposed action, these activities may affect southwestern willow flycatcher productivity with disturbances to breeding, nesting, and foraging behaviors and habitat (including areas of designated critical habitat), and result in fragmented habitat.

Conclusion

The conclusions of this biological opinion are based on full implementation of the programs as described in the “Description of the Proposed Action” section of this document, including the conservation measures that were incorporated into the project design.

After reviewing the status of the southwestern willow flycatcher, the environmental baseline for the action area, the effects of the proposed project, and the cumulative effects, it is the Service’s biological opinion that the Monticello BLM Field Office Resource Management Plan, as proposed, is not likely to jeopardize the continued existence of the southwestern willow flycatcher, and is not likely to destroy or adversely modify designated critical habitat. We base our conclusion on the following

1. The applicant committed resource protection measures will be incorporated into site-specific projects designed under the BLM Resource Management Plan. If project design cannot adhere to all applicant committed resource protection measures, consultation under Section 7 of the Endangered Species Act will be initiated.

2. All site-specific projects designed under the proposed BLM Resource Management Plan would be subject to consultation requirements under Section 7 of the Endangered Species Act.

Navajo Sedge (*Carex specuicola*)

Status of Species

Species Description

The Navajo sedge was listed as a threatened species on June 7, 1985. It occurs in wet seeps, springs, and hanging gardens on vertical cliffs of pink-red Navajo sandstone or other similar eolian sandstone formations (Natureserve 2006). Navajo sedge is endemic to San Juan County, Utah and Coconino County, Arizona on Navajo land at elevations from 3,770 to 5,980 feet. There is no designated critical habitat for this species in Utah. Existing threats to this species include grazing and groundwater pumping (Natureserve 2006, USFWS 1987).

Navajo sedge is a slender, perennial 10 to 18 inches high. The triangular stem extends from an elongate, slender rhizome. The leaves are pale green and clustered near the base of the plant. This species is unusual in having both two-branched styles with lenticular achenes, and three-branched styles with trigonous achenes. Flowers are concentrated in 2 to 4 groups or spikes. The terminal spike has both male and female flowers, with the female flowers situated above the male. The flowers are reduced and inconspicuous; they consist of small green-brown, scale-like parts 2 to 3 mm long and 1 to 1.5 mm wide.

Life History and Population Dynamics

Flowering and fruit set occur from spring through summer, but most reproduction appears to be vegetative (USFWS 1987).

Status and Distribution

Navajo sedge is restricted to moist sand to silty soils of shady seep-spring pockets or alcoves with somewhat limited soil development. It is limited to only a few known sites on Navajo Nation lands in northeastern Arizona and southwestern Utah (Natureserve 2006).

Critical habitat has been designated for this species, including the entire areas occupied by the three known populations of the plant. The locations are on the Navajo Indian Reservation in

Coconino County, Arizona, and are 40 x 5 meter rectangular with their long axes in the direction of seepspring flow, The total area designated comprises about 809 square meters (about 0.15 acres), and contains all habitat known to be occupied by the species when it was listed in 1985. Constituent elements are moist sandy to silty soils at shady seep-springs within the Navajo Sandstone Formation.

Environmental Baseline

Status of the Species within the Action Area

The only known population of this species in San Juan County is located on Navajo tribal land (phone call from Susan Martin, SWCA to Ben Franklin and UDWR on February 14, 2007) south of the Monticello planning area. There is suitable habitat for this species on BLM land within the planning area (Phone call from Ron Bolander, BLM to Susan Martin, SWCA; August 5, 2008). While no formal surveys for this plant have been performed in the action area, plant inventories have not found any evidence of this species.

Factors Affecting Species Environment within the Action Area

Factors that could affect the sedge include natural or human-directed disturbances, such as the modification of hydrology, increased recreation and OHV use, introduction or proliferation of invasive species, and livestock grazing.

Effects of the Action

There are no known populations of this species on BLM lands. However, suitable habitat exists. Because the PFO RMP is a long-range planning document, this effects analysis was conducted to determine potential effects should the species be found on BLM lands during the life of the RMP. Effects will only be realized if the plant is located; however, conservation measures would also be implemented to minimize such effect.

Livestock Grazing

The objective of livestock grazing management is to maintain or improve forage production and range condition as a sustainable resource base for livestock grazing on BLM land. Livestock management includes designating the kind and class of livestock, seasons of use, locations of use and the numbers of livestock that are permitted to use BLM lands.

Range management activities may include vegetation treatments such as prescribed fire, mechanical and chemical control of noxious weeds, sagebrush and other target species. The determinations and effects analyses associated with the potential impacts of these treatments can be located under the other appropriate program headings (i.e., fire treatments – see Fire Management, or vegetative treatments – see Vegetation Management). Other range improvements authorized by the livestock grazing management program may include fence construction, water developments, exclosures, and livestock handling facilities.

There are four primary ways livestock manipulate habitats to favor/hinder other species within the habitat: 1) alteration of vegetation composition, 2) cause increased/decreased productivity of selected plant species, 3) increase/decrease the nutritive quality of available forage, and/or 4) increase/decrease the diversity of habitats by altering structure (Severson and Urness 1994).

Activities occurring under this program may increase and concentrate domestic ungulate presence, increase motorized traffic, and increase surface disturbance from fence and livestock pond construction in Navajo sedge suitable habitat. Associated impacts include: trampling or

crushing of individuals, modification or degradation to suitable habitat, and removal of suitable habitat. As a result, there may be increased occurrence of plant damage or individual mortality.

Minerals Management

The planning area will be open to consideration for exploration, leasing, and development of leasable minerals (oil, gas, coal, tar sands), salable minerals (sand, gravel, clay, and stone) and locatable materials (uranium, gold, copper, and limestone). Although stipulations or conditions may be included in the terms of these mineral contracts, there are potential impacts associated with these various activities. Mineral exploration and extraction often results in surface disturbance from road and facility construction, removal of topsoil and overburden, stock piling of these materials, and post-mining reclamation and recontouring.

Activities occurring under this program in the Monticello Field Office may increase foot traffic, motorized traffic, and significant soil disturbance in Navajo sedge habitats. Associated impacts include: trampling or crushing of individuals, removal of suitable habitat, modification or degradation to suitable habitat, disturbance to species' pollinators, and increased occurrences and competition from invasive plant species. As a result, there may be decreased recruitment, and increased occurrence of plant damage or individual mortality.

Recreation Management

The recreation program includes providing for and managing recreational access, developing and maintaining recreation areas, issuing special recreation permits, providing information to the public about BLM's recreational resources, and assessing effects of recreational use on the natural resources. Under this program, OHV use, camping, rafting, hiking, fishing, boating, swimming, and other activities are allowed in designated areas.

Activities occurring under this program may increase human, horse, and motorized traffic in Navajo sedge suitable habitat. Associated impacts include: trampling or crushing of individuals, collection of individuals, modification or degradation to suitable habitat, and increased occurrences of invasive plant species. As a result, there may be decreased recruitment and increased occurrence of plant damage or individual mortality.

Wildlife and Fisheries Resource Management

This program aims to maintain biological diversity, support UDWR Herd Management Plans, improve habitat on for wildlife and fisheries, and provide habitats for threatened and endangered species.

Activities occurring under this program may increase foot traffic, motorized traffic, and/or significant soil disturbance in Navajo sedge suitable habitat. Associated impacts include: trampling or crushing of individuals, removal of suitable habitat, modification or degradation to suitable habitat, disturbance to species' pollinators, and increased occurrences of invasive plant species. As a result, there may be decreased recruitment and increased occurrence of plant damage or individual mortality.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

Cumulative effects to the Navajo sedge under the Proposed Actions would include, but are not limited to, the following broad types of impacts:

- Changes in land use patterns or practices that adversely affect a species' critical, suitable, or potential habitat.
- Program management actions by some, or all, of the following groups, on lands adjoining or upstream of BLM-administered lands:
 - State of Utah
 - County Governments in Utah
 - Local Governments in Utah
 - Private landholders in Utah

The Navajo sedge occurs primarily within tribal management boundaries. The Navajo sedge is susceptible to activities on these lands. Many of these activities, such as grazing, recreation activities (e.g. off-road vehicles), and cultural use are expected to continue on lands within the Navajo sedge's range. Contributing as cumulative effects to the proposed action, all these activities will continue to affect Navajo sedge populations by increasing mortalities, injuring plants, and further adversely impacting occupied and suitable habitat.

Conclusion

The conclusions of this biological opinion are based on full implementation of the project as described in the "Description of the Proposed Action" section of this document, including the resource protection measures that were incorporated into the project design.

After reviewing the current status of the Navajo sedge, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the USFWS's biological opinion that the Monticello Field Office's Resource Management Plan, as proposed, is not likely to jeopardize the continued existence of the Navajo sedge, and is not likely to destroy or adversely modify designated critical habitat. We base our conclusion on the following:

1. The applicant committed resource protection measures will be incorporated into site-specific projects designed under the BLM Resource Management Plan. If project design cannot adhere to all applicant committed resource protection measures, consultation under Section 7 of the Endangered Species Act will be initiated.
2. All site-specific projects designed under the proposed BLM Resource Management Plan would be subject to consultation requirements under Section 7 of the Endangered Species Act.

COLORADO RIVER FISH

Bonytail (*Gila elegans*)

Status of the Species

Species / Critical Habitat Description

Bonytail (*Gila elegans*) are medium-sized (less than 600 mm) fish in the minnow family. Adult bonytail are gray or olive colored on the back with silvery sides and a white belly. The adult bonytail have an elongated body with a long, thin caudal peduncle. The head is small and compressed compared to the rest of the body. The mouth is slightly overhung by the snout and there is a smooth low hump behind the head that is not as pronounced as the hump on a humpback chub. The bonytail chub was first listed on April 23, 1980 (45 FR 27710). It is currently designated as endangered throughout its entire range.

A total of 499 km (312 miles) of river has been designated as critical habitat for the bonytail in the Colorado River Basin, representing about 14% of the species' historic range (59 FR 13374). The USFWS has identified water, physical habitat, and the biological environment as the primary constituent elements of critical habitat (59 FR 13374). Water includes a quantity of water of sufficient quality delivered to a specific location in accordance with a hydrologic regime required for the particular life stage for each species. The physical habitat includes areas of the Colorado River system that are inhabited or potentially habitable for use in spawning and feeding, as a nursery, or serve as corridors between these areas. In addition, oxbows, backwaters, and other areas in the 100-year floodplain, when inundated, provide access to spawning, nursery, feeding, and rearing habitats. Food supply, predation, and competition are important elements of the biological environment.

River reaches that have been designated as critical habitat within the State of Utah include (59 FR 13374):

Utah, Uintah County; and Colorado, Moffat County. The Green River from the confluence with the Yampa River in T. 7 N., R. 103 W., section 28 (6th Principal Meridian) to the boundary of Dinosaur National Monument in T. 6 N., R. 24 E., section 30 (Salt Lake Meridian).

Utah, Uintah and Grand Counties. The Green River (Desolation and Gray Canyons) from Sumner's Amphitheater in T. 12 S., R. 18 E., section 5 (Salt Lake Meridian) to Swasey's Rapid (river mile 12) in T. 20 S., R. 16 E., section 3 (Salt Lake Meridian).

Utah, Grand County; and Colorado, Mesa County. The Colorado River from Black Rocks in T.10S., R.104W., sec. 25 (6th Principal Meridian) to Fish Ford in T.21S., R.24E., sec. 35 (Salt Lake Meridian).

Utah, Garfield and San Juan Counties. The Colorado River from Brown Betty Rapid in T.30S., R.18E., sec. 34 (Salt Lake Meridian) to Imperial Canyon in T.31S., R.17E., sec. 28 (Salt Lake Meridian).

Life History and Population Dynamics

The bonytail are considered a species that is adapted to mainstem rivers, where it has been observed in pools and eddies (Vanicek 1967, Minckley 1973). Spawning of bonytail has never been observed in a river, but ripe fish were collected in Dinosaur National Monument during late June and early July suggesting that spawning occurred at water temperatures of about 18°C (Vanicek and Kramer 1969). Similar to other closely related *Gila* species, bonytail probably spawn in rivers in spring over rocky substrates; spawning has been observed in reservoirs over rocky shoals and shorelines. It has been recently hypothesized that flooded bottomlands may provide important bonytail nursery habitat. Of five specimens captured most recently in the upper basin, four were captured in deep, swift, rocky canyons (Yampa Canyon, Black Rocks, Cataract Canyon, and Coal Creek Rapid), but the fifth was taken in Lake Powell. Since 1974, all bonytails captured in the lower basin have been caught in reservoirs. The diets of bonytail are presumed similar to that of the humpback chub (USFWS 2002a).

Status and Distribution

Bonytail are endemic to the Colorado River Basin and was historically common to abundant in warm-water reaches of larger rivers of the basin from Mexico to Wyoming. The species experienced a dramatic, but poorly documented, decline starting in about 1950, following construction of several mainstem dams, introduction of nonnative fishes, poor land-use practices, and degraded water quality (USFWS 2002a).

Currently, no self-sustaining populations of bonytail are known to exist in the wild, and very few individuals have been caught anywhere within the basin. An unknown, but small number of wild adults exist in Lake Mohave on the mainstem Colorado River. Since 1977, only 11 wild adults have been reported from the upper basin (Valdez et al. 1994).

Bonytail are the rarest native fish in the Colorado River. Little is known about its specific habitat requirements or cause of decline, because the bonytail was extirpated from most of its historic range prior to extensive fishery surveys. It was listed as endangered on April 23, 1980. Currently, no documented self-sustaining populations exist in the wild. Formerly reported as widespread and abundant in mainstem rivers (Jordan and Evermann 1896), its populations have been greatly reduced. Remnant populations presently occur in the wild in low numbers in Lake Mohave and several fish have been captured in Lake Powell and Lake Havasu (USFWS 2002a). The last known riverine area where bonytail were common was the Green River in Dinosaur National Monument, where Vanicek (1967) and Holden and Stalnaker (1970) collected 91 specimens during 1962-1966. From 1977 to 1983, no bonytail were collected from the Colorado or Gunnison rivers in Colorado or Utah (Wick et al. 1979, 1981; Valdez et al. 1982; Miller et al. 1984). However, in 1984, a single bonytail was collected from Black Rocks on the Colorado River (Kaeding et al. 1986). Several suspected bonytail were captured in Cataract Canyon in 1985-1987 (Valdez 1990). Current stocking plans are planned to continue for at least two more years, however, catch rates indicate stocking will continue until at least 2010 and probably longer (Thomas Czapla, personal communication).

Environmental Baseline

Status of the Species within the Action Area

Bonytail were once widespread in the large rivers of the Colorado River Basin (Cope and Yarrow 1875, Jordan 1891, Jordan and Evermann 1896, Gilbert and Scofield 1898, Kirsch 1889, Chamberlain 1904). The species experienced a dramatic, but poorly documented, decline starting in about 1950, following construction of mainstem dams, introduction of nonnative fishes, poor land-use practices, and degraded water quality (Miller 1961, Ono et al. 1983). A stocking program is being implemented to reestablish populations in the upper Colorado River basin.

The Monticello planning area contains both populations and designated critical habitat for the bonytail. Historically the bonytail was once widespread throughout the Colorado River Basin. Today it is thought to be found in large river reaches of the Colorado and Green Rivers (USFWS 2002b). Recruitment in the natural environment is apparently nonexistent or extremely low. Existing threats to this species include streamflow regulations, competition and predation by non-native fish species, and reduction in water levels associated with urban and energy development withdrawals (USFWS 2002b).

A Recovery Plan was completed for this species in 1990 and revised in 2002 (USFWS 1990b; USFWS 2002b). In addition, the BLM is party to the Upper Colorado River Endangered Fish Recovery Program (UCRRP), a Cooperative Agreement with other federal agencies, water users, energy distributors, and environmental groups to recover the bonytail and other fish in the upper Colorado River Basin (USFWS 2002b). This agreement includes provisions for instream flow protection, habitat restoration, reduction of nonnative fish species, research, monitoring, and management (USFWS 2002b). Under the authority of current Utah BLM LUPs, the BLM provides species-specific guidance, intended to avoid, minimize, or reduce the potential adverse impacts from implementation of BLM actions on the bonytail (USFWS 2006a).

Factors Affecting Species Environment within the Action Area

The primary threats to bonytail are stream flow regulation and habitat modification; competition with and predation by nonnative fishes; hybridization with other native *Gila* species; and pesticides and pollutants (USFWS 2002a). The existing habitat, altered by these threats, has been modified to the extent that it impairs essential behavior patterns, such as breeding, feeding, and sheltering. The threats to bonytail in relation to flow regulation and habitat modification, predation by nonnative fishes, and pesticides and pollutants are essentially the same threats identified for Colorado pikeminnow. Threats to bonytail in relation to hybridization are essentially the same threats identified for humpback chub.

Management actions identified in the recovery goals for bonytail (USFWS 2002a) to minimize or remove threats to the species include:

- provide and legally protect habitat (including flow regimes necessary to restore and maintain required environmental conditions) necessary to provide adequate habitat and sufficient range for all life stages to support recovered populations;

- provide passage over barriers within occupied habitat to allow unimpeded movement and, potentially, range expansion;
- investigate options for providing appropriate water temperatures in the Gunnison River;
- minimize entrainment of subadults and adults at diversion/out-take structures;
- investigate habitat requirements for all life stages and provide those habitats;
- ensure adequate protection from overutilization;
- ensure adequate protection from diseases and parasites;
- regulate nonnative fish releases and escapement into the main river, floodplain, and tributaries;
- control problematic nonnative fishes as needed;
- minimize the risk of increased hybridization among *Gila* spp.;
- minimize the risk of hazardous-materials spills in critical habitat; and
- remediate water-quality problems.

Colorado pikeminnow (*Ptychocheilus lucius*)

Status of the Species

Species / Critical Habitat Description

The Colorado pikeminnow (*Ptychocheilus lucius*) are the largest cyprinid fish (minnow family) native to North America and it evolved as the main predator in the Colorado River system. It is an elongated pike-like fish that during predevelopment times may have grown as large as 6 feet in length and weighed nearly 100 pounds (Behnke and Benson 1983). Today, Colorado pikeminnow rarely exceed 3 feet in length or weigh more than 18 pounds; such fish are estimated to be 45-55 years old (Osmundson et al. 1997). The mouth of this species is large and nearly horizontal with long slender pharyngeal teeth (located in the throat), adapted for grasping and holding prey. The diet of Colorado pikeminnow longer than 3 or 4 inches consists almost entirely of other fishes (Vanicek and Kramer 1969). Males become sexually mature earlier and at a smaller size than do females, though all are mature by about age 7 and 500 mm (20 inches) in length (Vanicek and Kramer 1969, Seethaler 1978, Hamman 1981). Adults are strongly countershaded with a dark, olive back, and a white belly. Young are silvery and usually have a dark, wedge-shaped spot at the base of the caudal fin.

The Colorado pikeminnow was first listed on March 11, 1967 (32 FR 4001). It is currently designated as endangered throughout its range, except in the Salt and Verde River drainages in Arizona.

The USFWS designated six reaches of the Colorado River System as critical habitat for the Colorado pikeminnow on March 21, 1994 (59 FR 13374). These reaches total 1,848 km (1,148 mi) as measured along the center line of each reach. Designated critical habitat makes up about 29% of the species' original range and occurs exclusively in the Upper Colorado River Basin. Critical habitat is designated in portions of the Colorado, Green, Yampa, White, and San Juan Rivers in the Upper Basin.

The USFWS has identified water, physical habitat, and the biological environment as the primary constituent elements of critical habitat (59 FR 13374). Water includes a quantity of

water of sufficient quality delivered to a specific location in accordance with a hydrologic regime required for the particular life stage for each species. The physical habitat includes areas of the Colorado River system that are inhabited or potentially habitable for use in spawning and feeding, as a nursery, or serve as corridors between these areas. In addition, oxbows, backwaters, and other areas in the 100-year floodplain, when inundated, provide access to spawning, nursery, feeding, and rearing habitats. Food supply, predation, and competition are important elements of the biological environment.

Life History and Population Dynamics

The Colorado pikeminnow are long-distance migrators; adults move hundreds of miles to and from spawning areas, and require long sections of river with unimpeded passage. Adults require pools, deep runs, and eddy habitats maintained by high spring flows. These high spring flows maintain channel and habitat diversity, flush sediments from spawning areas, rejuvenate food production, form gravel and cobble deposits used for spawning, and rejuvenate backwater nursery habitats. Spawning occurs after spring runoff at water temperatures typically between 18 and 23°C. Spawning has occurred as early as June 15th in some years and as late as August 15th. After hatching and emerging from spawning substrate, larvae drift downstream to nursery backwaters that are restructured by high spring flows and maintained by relatively stable base flows. Flow recommendations have been developed that specifically consider flow-habitat relationships in habitats occupied by Colorado pikeminnow in the upper basin, and were designed to enhance habitat complexity and to restore and maintain ecological processes. The following is a description of observed habitat uses in the Upper Colorado River Basin.

Colorado pikeminnow live in warm-water reaches of the Colorado River mainstem and larger tributaries, and require uninterrupted stream passage for spawning migrations and dispersal of young. The species is adapted to a hydrologic cycle characterized by large spring peaks of snow-melt runoff and low, relatively stable base flows. High spring flows create and maintain in-channel habitats, and reconnect floodplain and riverine habitats, a phenomenon described as the spring flood-pulse (Junk et al. 1989, Johnson et al. 1995). Throughout most of the year, juvenile, subadult, and adult Colorado pikeminnow use relatively deep, low-velocity eddies, pools, and runs that occur in near-shore areas of main river channels (Tyus and McAda 1984; Valdez and Masslich 1989; Tyus 1990, 1991; Osmundson et al. 1995). In spring, however, Colorado pikeminnow adults use floodplain habitats, flooded tributary mouths, flooded side canyons, and eddies that are available only during high flows (Tyus 1990, 1991; Osmundson et al. 1995). Such environments may be particularly beneficial for Colorado pikeminnow because other riverine fishes gather in floodplain habitats to exploit food and temperature resources, and may serve as prey. Such low-velocity environments also may serve as resting areas for Colorado pikeminnow. River reaches of high habitat complexity appear to be preferred.

Because of their mobility and environmental tolerances, adult Colorado pikeminnow are more widely distributed than other life stages. Distribution patterns of adults are stable during most of the year (Tyus 1990, 1991; Irving and Modde 2000), but distribution of adults changes in late spring and early summer, when most mature fish migrate to spawning areas (Tyus and McAda 1984; Tyus 1985, 1990, 1991; Irving and Modde 2000). High spring flows provide an important cue to prepare adults for migration and also ensure that conditions at spawning areas are suitable for reproduction once adults arrive. Specifically, bankfull or much larger floods mobilize coarse

sediment to build or reshape cobble bars, and they create side channels that Colorado pikeminnow sometimes use for spawning (Harvey et al. 1993).

Colorado pikeminnow spawning sites in the Green River subbasin have been well documented. The two principal locations are in Yampa Canyon on the lower Yampa River and in Gray Canyon on the lower Green River (Tyus 1990 and 1991). These reaches are 42 and 72 km long, respectively, but most spawning is believed to occur at one or two short segments within each of the two reaches. Another spawning area may occur in Desolation Canyon on the lower Green River (Irving and Modde 2000), but the location and importance of this area has not been verified. Although direct observation of Colorado pikeminnow spawning was not possible because of high turbidity, radiotelemetry indicated spawning occurred over cobble-bottomed riffles (Tyus 1990). High spring flows and subsequent post-peak summer flows are important for construction and maintenance of spawning substrates (Harvey et al. 1993). In contrast with the Green River subbasin, where known spawning sites are in canyon-bound reaches, currently suspected spawning sites in the upper Colorado River subbasin are at six locations in meandering, alluvial reaches (McAda 2000).

After hatching and emerging from the spawning substrate, Colorado pikeminnow larvae drift downstream to backwaters in sandy, alluvial regions, where they remain through most of their first year of life (Holden 1977, Tyus and Haines 1991, Muth and Snyder 1995). Backwaters and the physical factors that create them are vital to successful recruitment of early life stages of Colorado pikeminnow, and age-0 Colorado pikeminnow in backwaters have received much research attention (e.g., Tyus and Karp 1989, Haines and Tyus 1990, Tyus 1991, Tyus and Haines 1991, Bestgen et al. 1997). It is important to note that these backwaters are formed after cessation of spring runoff within the active channel and are not floodplain features. Colorado pikeminnow larvae occupy these in-channel backwaters soon after hatching. They tend to occur in backwaters that are large, warm, deep (average, about 0.3 m in the Green River), and turbid (Tyus and Haines 1991). Recent research (Day et al. 1999a and 1999b; Trammell and Chart 1999) has confirmed these preferences and suggested that a particular type of backwater is preferred by Colorado pikeminnow larvae and juveniles. Such backwaters are created when a secondary channel is cut off at the upper end, but remains connected to the river at the downstream end. These chute channels are deep and may persist even when discharge levels change dramatically. An optimal river-reach environment for growth and survival of early life stages of Colorado pikeminnow have warm, relatively stable backwaters, warm river channels, and abundant food (Muth et al. 2000).

Status and Distribution

Based on early fish collection records, archaeological finds, and other observations, the Colorado pikeminnow was once found throughout warm water reaches of the entire Colorado River Basin down to the Gulf of California, and including reaches of the upper Colorado River and its major tributaries, the Green River and its major tributaries, and the Gila River system in Arizona (Seethaler 1978). Colorado pikeminnow apparently were never found in colder, headwater areas. The species was abundant in suitable habitat throughout the entire Colorado River Basin prior to the 1850s (Seethaler 1978). By the 1970s they were extirpated from the entire lower basin (downstream of Glen Canyon Dam) and portions of the upper basin as a result of major alterations to the riverine environment. Having lost some 75 to 80 percent of its former range

due to habitat loss, the Colorado pikeminnow was federally listed as an endangered species in 1967 (Miller 1961, Moyle 1976, Tyus 1991, Osmundson and Burnham 1998). Full protection under the Act of 1973 occurred on January 4, 1974.

Colorado pikeminnow are presently restricted to the Upper Colorado River Basin and inhabit warm water reaches of the Colorado, Green, and San Juan rivers and associated tributaries (Figure 5). The Colorado pikeminnow recovery goals (USFWS 2002a) identify occupied habitat of wild Colorado pikeminnow as follows: the Green River from Lodore Canyon to the confluence of the Colorado River; the Yampa River downstream of Craig, Colorado; the Little Snake River from its confluence with the Yampa River upstream into Wyoming; the White River downstream of Taylor Draw Dam; the lower 89 miles of the Price River; the lower Duchesne River; the upper Colorado River from Palisade, Colorado, to Lake Powell; the lower 34 miles of the Gunnison River; the lower mile of the Dolores River; and 150 miles of the San Juan River downstream from Shiprock, New Mexico, to Lake Powell. Colorado pikeminnow have been stocked in recent years, changes to the stocking plan are awaiting population estimates. In recent years the pikeminnow has been increasing the Colorado river but decreasing in the Green river (Thomas Czaplá, personal communication).

Environmental Baseline

Status of the Species within the Action Area

Preliminary population estimates presented in the Recovery Goals (USFWS 2002) for the three Colorado pikeminnow populations ranged from approximately 6,600 to 8,900 wild adults: Green River Subbasin, 6,000–8,000 (Nesler 2000, USFWS 2002); Upper Colorado River Subbasin, 600–900 (Nesler 2000, Osmundson 2002 [includes some subadults]); and San Juan River Subbasin, 19–50 (Holden 1999, USFWS 2002). These numbers provided a general indication of the total wild adult population size at the time the Recovery Goals were developed, however, it was also recognized that the accuracy of the estimates vary among populations. Monitoring of Colorado pikeminnow populations is ongoing and sampling protocols and the reliability of the population estimates are being assessed by the Service and cooperating entities.

The Monticello planning area contains populations and designated critical habitat for the Colorado pikeminnow. Natural populations of this species are restricted to the upper Colorado River Basin in Wyoming, Colorado, Utah, and New Mexico (USFWS 2002c). The main stem of the Colorado River from Palisade, Colorado to Lake Powell has known population within this region. A small reproducing population exists in the San Juan River. According to the Colorado pikeminnow recovery goals, these fish can be found in the San Juan River from Shiprock, New Mexico to the inflow of Lake Powell (USFWS 2002c). Flow regulations, migration barriers, habitat loss/alteration, and introduced non-native fish have all been identified as causes for population decline.

A Recovery Plan for the Colorado pikeminnow was completed in 1990 and revised in 2002 (USFWS 2002c; USFWS 1990a). In addition, the BLM is party to the Upper Colorado River Endangered Fish Recovery Program (UCRRP), a Cooperative Agreement with other federal agencies, water users, energy distributors, and environmental groups to recover the Colorado pikeminnow and other fish in the Upper Colorado River Basin (USFWS 2002c). This agreement includes provisions for instream flow protection, habitat restoration, reduction of nonnative fish

species, research, monitoring, and management (USFWS 2002c). Under the authority of current Utah BLM LUPs, the USFWS provides species-specific guidance, intended to avoid, minimize, or reduce the potential adverse impacts from implementation of BLM actions on the pikeminnow (USFWS 2006a).

Factors Affecting Species Environment within the Action Area

The primary threats to Colorado pikeminnow are stream flow regulation and habitat modification; competition with and predation by nonnative fishes; and pesticides and pollutants (USFWS 2002a). The existing habitat, altered by these threats, has been modified to the extent that it impairs essential behavior patterns, such as breeding, feeding, and sheltering. These impairments are described in further detail below.

Stream flow regulation includes mainstem dams that cause the following adverse effects to Colorado pikeminnow and its habitat:

- block migration corridors,
- changes in flow patterns, reduced peak flows and increased base flows,
- release cold water, making temperature regimes less than optimal,
- change river habitat into lake habitat, and
- retain sediment that is important for forming and maintaining backwater habitats.

Cold water releases from dams eliminate suitable habitat for native fishes, including Colorado pikeminnow, from river reaches downstream for approximately 50 miles. In addition to main stem dams, many dams and water diversion structures occur in and upstream from critical habitat that reduce flows and alter flow patterns, which adversely affect critical habitat. Diversion structures in critical habitat divert fish into canals and pipes where the fish are permanently lost to the river system. It is unknown how many endangered fish are lost in irrigation systems, but in some years, in some river reaches, majority of the river flow is diverted into unscreened canals. High spring flows maintain habitat diversity, flush sediments from spawning habitat, increase invertebrate food production, form gravel and cobble deposits important for spawning, and maintain backwater nursery habitats (McAda 2000, Muth et al. 2000).

Predation and competition from nonnative fishes have been clearly implicated in the population reductions or elimination of native fishes in the Colorado River Basin (Dill 1944, Osmundson and Kaeding 1989, Behnke 1980, Joseph et al. 1977, Lanigan and Berry 1979, Minckley and Deacon 1968, Meffe 1985, Propst and Bestgen 1991, Rinne 1991). Data collected by Osmundson and Kaeding (1991) indicated that during low water years, nonnative minnows capable of preying on or competing with larval endangered fishes greatly increased in numbers.

More than 50 nonnative fish species were intentionally introduced in the Colorado River Basin prior to 1980 for sportfishing, forage fish, biological control and ornamental purposes (Minckley 1982, Tyus et al. 1982, Carlson and Muth 1989). Nonnative fishes compete with native fishes in several ways. The capacity of a particular area to support aquatic life is limited by physical habitat conditions. Increasing the number of species in an area usually results in a smaller population of most species. The size of each species population is controlled by the ability of each life stage to compete for space and food resources and to avoid predation. Some life stages

of nonnative fishes appear to have a greater ability to compete for space and food and to avoid predation in the existing altered habitat than do some life stages of native fishes. Tyus and Saunders (1996) cite numerous examples of both indirect and direct evidence of predation on razorback sucker eggs and larvae by nonnative species.

Threats from pesticides and pollutants include accidental spills of petroleum products and hazardous materials; discharge of pollutants from uranium mill tailings; and high selenium concentration in the water and food chain (USFWS 2002a). Accidental spills of hazardous material into critical habitat can cause immediate mortality when lethal toxicity levels are exceeded. Pollutants from uranium mill tailings cause high levels of ammonia that exceed water quality standards. High selenium levels may adversely affect reproduction and recruitment (Hamilton and Wiedmeyer 1990, Stephens et al. 1992, Hamilton and Waddell 1994, Hamilton et al. 1996, Stephens and Waddell 1998, Osmundson et al. 2000).

Humpback chub (*Gila cypha*)

Status of the Species

Species / Critical Habitat Description

The humpback chub (*Gila cypha*) are a medium-sized freshwater fish (less than 500 mm) of the minnow family. The adults have a pronounced dorsal hump, a narrow flattened head, a fleshy snout with an inferior-subterminal mouth, and small eyes. It has silvery sides with a brown or olive colored back. The humpback chub are endemic to the Colorado River Basin and is part of a native fish fauna traced to the Miocene epoch in fossil records (Miller 1946, Minckley et al. 1986). Humpback chub remains have been dated to about 4000 B.C., but the fish was not described as a species until the 1940s (Miller 1946), presumably because of its restricted distribution in remote white water canyons (USFWS 1990). Because of this, its original distribution is not known. The humpback chub was listed as endangered on March 11, 1967.

Until the 1950s, the humpback chub was known only from Grand Canyon. During surveys in the 1950s and 1960s humpback chub were found in the upper Green River including specimens from Echo Park, Island Park, and Swallow Canyon (Smith 1960, Vanicek et al. 1970). Individuals were also reported from the lower Yampa River (Holden and Stalnaker 1975), the White River in Utah (Sigler and Miller 1963), Desolation Canyon of the Green River (Holden and Stalnaker 1970) and the Colorado River near Moab (Sigler and Miller 1963).

The USFWS designated seven reaches of the Colorado River system as critical habitat for the humpback chub on March 21, 1994 (59 FR 13374). These reaches total 610 km (379 mi) as measured along the center line of the subject reaches. Designated critical habitat makes up about 28% of the species' original range and occurs in both the Upper and Lower Colorado River Basins. Critical habitat for the humpback chub are designated for portions of the Colorado, Green, and Yampa Rivers in the Upper Basin and the Colorado and Little Colorado Rivers in the Lower Basin. The primary constituent elements are the same as those described for Colorado pikeminnow.

Life History and Population Dynamics

Unlike Colorado pikeminnow and razorback sucker, which are known to make extended migrations of up to several hundred miles to spawning areas, humpback chubs do not appear to make extensive migrations (Karp and Tyus 1990). Generally, humpback chub show fidelity for canyon reaches and move very little (Miller et al. 1982; Archer et al. 1985; Burdick and Kaeding 1985, Kaeding et al. 1990). Humpback chubs in Black Rocks (Valdez and Clemmer 1982), Westwater Canyon (Chart and Lentsch 1999a), and Desolation and Gray Canyons (Chart and Lentsch 1999b) do not migrate to spawn and movements of adult humpback chub in Black Rocks on the Colorado River were essentially restricted to a 1-mile reach. These results were based on the recapture of Carlin-tagged fish and radiotelemetry studies conducted from 1979 to 1981 (Valdez et al. 1982) and 1983 to 1985 (Archer et al. 1985, USFWS 1986, Kaeding et al. 1990).

In the Green River and upper Colorado River, humpback chubs spawned in spring and summer as flows declined shortly after the spring peak (Valdez and Clemmer 1982, Valdez et al. 1982, Kaeding and Zimmerman 1983, Tyus and Karp 1989, Karp and Tyus 1990, Chart and Lentsch 1999a and 1999b). Similar spawning periods were reported from Grand Canyon (Kaeding and Zimmerman 1983; Valdez and Ryel 1995, 1997). Although humpback chub are believed to broadcast eggs over mid-channel cobble and gravel bars, spawning in the wild has not been observed for this species. Gorman and Stone (1999) reported that ripe male humpback chubs in the Little Colorado River (LCR) aggregated in areas of complex habitat structure (i.e., matrix of large boulders and travertine masses combined with chutes, runs, and eddies, 0.5–2.0 m deep) and were associated with deposits of clean gravel.

Chart and Lentsch (1999b) estimated hatching dates for young *Gila* collected from Desolation and Gray Canyons between 1992 and 1995. They determined that hatching occurred on the descending limb of the hydrograph as early as 9 June 1992 at a flow of 139 m³/s and as late as 1 July 1995 at a flow of 731 m³/s. Instantaneous daily river temperatures on hatching dates over all years ranged from 20 to 22°C.

Newly hatched larvae average 6.3–7.5 mm TL (Holden 1973, Suttkus and Clemmer 1977, Minckley 1973, Snyder 1981, Hamman 1982, Behnke and Benson 1983, Muth 1990), and 1-month-old fish are approximately 20 mm long (Hamman 1982). Unlike Colorado pikeminnow and razorback sucker, no evidence exists of long-distance larval drift (Miller and Hubert 1990, Robinson et al. 1998). Upon emergence from spawning gravels, humpback chub larvae remain in the vicinity of bottom surfaces (Marsh 1985) near spawning areas (Chart and Lentsch 1999a).

Backwaters, eddies, and runs have been reported as common capture locations for young-of-year humpback chub (Valdez and Clemmer 1982). These data indicate that in Black Rocks and Westwater Canyon, young utilize shallow areas. Habitat suitability index curves developed by Valdez et al. (1990) indicate young-of-year prefer average depths of 2.1 feet with a maximum of 5.1 feet. Average velocities were reported at 0.2 feet per second.

Valdez et al. (1982), Wick et al. (1979), and Wick et al. (1981) found adult humpback chub in Black Rocks and Westwater Canyons in water averaging 50 feet in depth with a maximum depth

of 92 feet. In these localities, humpback chub were associated with large boulders and steep cliffs.

Status and Distribution

Historic abundance of the humpback chub are unknown, and historic distribution is surmised from various reports and collections that indicate the species presently occupies about 68% of its historic habitat and is restricted to about 756 km of river. The species exists primarily in relatively inaccessible canyons of the Colorado River Basin and was rare in early collections (Tyus 1998). Common use of the name “bonytail” for all six Colorado River species or subspecies of the genus *Gila* confounded an accurate early assessment of distribution and abundance (Holden and Stalnaker 1975, Valdez and Clemmer 1982, Minckley 1996). Of three closely related and sympatric *Gila* species, the roundtail chub (*G. robusta*) and bonytail (*G. elegans*) were described in 1853 by Baird and Girard (Sitgreaves 1853, Girard 1856), but the humpback chub was the last big-river fish species to be described from the Colorado River Basin in 1946 (Miller 1946). Also, extensive human alterations throughout the basin prior to faunal surveys may have depleted or eliminated the species from some river reaches before its occurrence was documented.

It is surmised that the humpback chub speciated from a *G. robusta*-like form in canyons of northern Arizona (i.e., Grand Canyon) about 3–5 million years ago (Miller 1946, Uyeno and Miller 1965, Holden 1968, Minckley et al. 1986) during the mid-Pliocene and early Pleistocene epochs. Earliest evidence of the species are skeletal remains from 4,000-year old flood deposits in Stanton’s Cave in Grand Canyon (Miller 1955, Euler 1978, Miller and Smith 1984), from a 750–1,100-year old archeological site in Catclaw Cave near present-day Hoover Dam (Miller 1955, Jones 1985), and from 1,000-year old archeological sites in Dinosaur National Monument, Colorado (Tyus 1998).

Earliest collections of humpback chub are anecdotal and related to early explorations of the Colorado River Basin that pre-date the species description in 1946. In 1911, Elsworth and Emory Kolb (Kolb and Kolb 1914) reported a large aggregation of “*bony tail*” in the lower Little Colorado River (LCR) in Grand Canyon; photographs show that the fish were humpback chub. A specimen in the fish collection at Grand Canyon National Park, caught in 1932 by angler N.N. Dodge at Bright Angel Creek, was examined in fall 1942 and used as the holotype for the species description (Miller 1946), along with a second specimen of unknown origin. In the 1940’s, five specimens of humpback chub were collected from the Grand Canyon region along with 16 specimens of *G. elegans* and six *G. robusta* (Miller 1944, Bookstein et al. 1985). In 1950, juvenile humpback chub were reported from Spencer Creek in lower Grand Canyon (Wallis 1951, Kubly 1990), but ichthyofaunal surveys in 1958–1959 (McDonald and Dotson 1960) failed to find humpback chub immediately upstream in the gentle meandering reaches of Glen Canyon.

Following completion of Glen Canyon Dam in 1963, humpback chub were consistently reported by Arizona Game and Fish Department creel surveys from Lee Ferry during 1963–1968 (Stone 1964 and 1966, Stone and Queenan 1967, Stone and Rathbun 1968). However, Stone and Rathbun (1968) failed to find humpback chub in seven tributaries sampled between Lee Ferry and Lake Mead in 1968, excluding the LCR. Humpback chub were captured in July 1967 and August 1970 (Holden and Stalnaker 1975), all within “...a few hundred meters downstream of

Glen Canyon Dam” (personal communication, P. Holden, Bio/West, Inc.). Humpback chub have not been captured in this reach since the dam began releasing cold hypolimnetic waters in about 1970. Humpback chub have consistently been reported in the LCR and Colorado River in Grand Canyon since 1967 as a result of better sampling gear and a better understanding of the life history of the species (Stone and Rathbun 1968, Miller and Smith 1972, Holden and Stalnaker 1975, Suttkus 1976, Minckley and Blinn 1976, Suttkus and Clemmer 1977, Kaeding and Zimmerman 1983, Maddux et al. 1987, Valdez and Ryel 1995, Arizona Game and Fish Department 1996, Douglas and Marsh 1996).

Five specimens were reported from Lake Powell in the late 1960's (Holden and Stalnaker 1970) following completion of Glen Canyon Dam in 1963 and impoundment of the upper Colorado River through Glen, Narrow, and Cataract canyons. Reproducing populations of humpback chub were first reported from Black Rocks, Colorado in 1977 (Kidd 1977), and from Westwater and Cataract canyons, Utah, in 1979 (Valdez et al. 1982, Valdez and Clemmer 1982).

Humpback chub were first reported in the Upper Colorado River Basin in the 1940's from Castle Park, Yampa River, Colorado, in June and July 1948 (Tyus 1998). Pre-impoundment surveys of Flaming Gorge Dam on the Green River in 1958–1959 (Bosley 1960, Gaufin et al. 1960, McDonald and Dotson 1960) treated all *Gila* as “*bonytail*”, which were common downstream of Green River, Wyoming. Humpback chub were reported from Hideout Canyon in the upper Green River (Smith 1960), although a checklist of fish killed by a massive rotenone operation from Hideout Canyon to Brown's Park in September 1962 stated that “...no humpback chub were collected...” (Binns 1967). Post-impoundment investigations (Vanicek et al. 1970) reported three humpback chub from the Green River downstream of Flaming Gorge Dam; one each from Echo Park, Island Park, and Swallow Canyon. Specimens were collected in Desolation Canyon on the Green River in 1967 (Holden and Stalnaker 1970), in Yampa Canyon in 1969 (Holden and Stalnaker 1975), in Cross Mountain Canyon of the Yampa River in the 1970's, and an individual specimen was reported from the White River in Utah in the 1950's (Sigler and Miller 1963). Seven suspected humpback chub were captured in the Little Snake River, a tributary of the Yampa River in 1988 (Wick et al. 1991). Surveys downstream of Flaming Gorge Dam, including Lodore Canyon, have not yielded humpback chub in that region of the Green River, despite warmer dam releases (Holden and Crist 1981, Bestgen and Crist 2000).

Six humpback chub populations are currently identified: (1) Black Rocks, Colorado; (2) Westwater Canyon, Utah; (3) Lower Colorado Region and Colorado rivers in Grand Canyon, Arizona; (4) Yampa Canyon, Colorado; (5) Desolation/Gray Canyons, Utah; and (6) Cataract Canyon, Utah (see Figure 1 in section 3.1.2; Valdez and Clemmer 1982, USFWS 1990a). Each population consists of a discrete group of fish, geographically separated from the other populations, but with some exchange of individuals. River length occupied by each population varies from 3.7 km in Black Rocks to 73.6 km in Yampa Canyon. Humpback chub have yet to be stocked, however, the Fish and Wildlife Service Hatchery system is collecting Yampa Canyon individuals for captivity to preserve their unique genetics (Thomas Czaplá, personal communication)

Recovery goals for the humpback chub (USFWS 2002) were approved on August 1, 2002. According to these recovery goals, downlisting can be considered if, over a 5-year period:

- the trend in adult (age 4+; > 200 mm total length) point estimates for each of the six extant populations does not decline significantly; and
- mean estimated recruitment of age-3 (150–199 mm total length) naturally produced fish equals or exceeds mean annual adult mortality for each of the six extant populations; and
- two genetically and demographically viable, self-sustaining core populations are maintained, such that each point estimate for each core population exceeds 2,100 adults (2,100 is the estimated minimum viable population needed to ensure long-term genetic and demographic viability); and
- certain site-specific management tasks to minimize or remove threats have been identified, developed, and implemented.

Environmental Baseline

Status of the Species within the Action Area

The Monticello planning area contains both populations and USFWS designated Critical Habitat for the humpback chub (see map in Appendix A). The humpback chub is endemic to warm water river systems in the Colorado River Basin. Populations of humpback chub have been identified in the Upper Colorado River Basin with the highest concentrations found in the Black Rocks and Westwater Canyon reaches of the Colorado River near the Colorado/Utah state line (USFWS 1990c). The presence of juvenile populations suggests spawning may occur in the Upper Colorado River at Black Rock, Westwater Canyon, Cataract Canyon, and Desolation/Gray Canyon. Flow alterations have been identified as a significant cause of decline.

A Recovery Plan was completed for this species in 1979 and revised in 1984 (USFWS 1990c). In addition, the BLM is party to the UCRRP, a Cooperative Agreement with other federal agencies, water users, energy distributors, and environmental groups to recover the humpback chub and other fishes in the Upper Colorado River Basin (USFWS 1990c). This agreement includes provisions for instream flow protection, habitat restoration, reduction of nonnative fish species, research, monitoring, and management (USFWS 1990c). Under the authority of current Utah BLM LUPs, the USFWS provides species-specific guidance, intended to avoid, minimize, or reduce the potential adverse impacts from implementation of BLM actions on the humpback chub (USFWS 2006a).

Factors Affecting Species Environment within the Action Area

Although historic data are limited, the apparent range-wide decline in humpback chubs is likely due to a combination of factors including alteration of river habitats by reservoir inundation, changes in stream discharge and temperature, competition with and predation by introduced fish species, and other factors such as changes in food resources resulting from stream alterations (USFWS 1990).

The primary threats to humpback chub are stream flow regulation and habitat modification; competition with and predation by nonnative fishes; parasitism; hybridization with other native *Gila* species; and pesticides and pollutants (USFWS 2002). The existing habitat, altered by these threats, has been modified to the extent that it impairs essential behavior patterns, such as breeding, feeding, and sheltering. The threats to humpback chub in relation to flow regulation

and habitat modification, predation by nonnative fishes, and pesticides and pollutants are essentially the same threats identified for Colorado pikeminnow.

Hybridization with roundtail chub (*Gila robusta*) and bonytail, where they occur with humpback chub, is recognized as a threat to humpback chub. A larger proportion of roundtail chub have been found in Black Rocks and Westwater Canyon during low flow years (Kaeding et al. 1990, Chart and Lentsch 2000), which increase the chances for hybridization.

Management actions identified in the recovery goals for humpback chub (USFWS 2002) to minimize or remove threats to the species included:

- provide and legally protect habitat (including flow regimes necessary to restore and maintain required environmental conditions) necessary to provide adequate habitat and sufficient range for all life stages to support recovered populations,
- investigate the role of the mainstem Colorado River in maintaining the Grand Canyon population,
- investigate the anticipated effects of and options for providing warmer water temperatures in the mainstem Colorado River through Grand Canyon,
- ensure adequate protection from overutilization,
- ensure adequate protection from diseases and parasites,
- regulate nonnative fish releases and escapement into the main river, floodplain, and tributaries,
- control problematic nonnative fishes as needed,
- minimize the risk of increased hybridization among *Gila* spp., and
- minimize the risk of hazardous-materials spills in critical habitat.

Razorback sucker (*Xyrauchen texanus*)

Status of the Species

Species / Critical Habitat Description

Like all suckers (family Catostomidae, meaning “down mouth”), the razorback sucker (*Xyrauchen texanus*) have ventral mouths with thick lips covered with papillae and no scales on its head. In general, suckers are bottom browsers, sucking up or scraping off small invertebrates, algae, and organic matter with their fleshy, protrusible lips (Moyle 1976). The razorback suckers are the only sucker with an abrupt sharp-edged dorsal keel behind its head. The keel becomes more massive with age. The head and keel are dark, the back is olive-colored, the sides are brownish or reddish, and the abdomen is yellowish white (Sublette et al. 1990). Adults often exceed 3 kg (6 pounds) in weight and 600 mm (2 feet) in length. Like Colorado pikeminnow, razorback suckers are long-lived, living 40-plus years. The razorback sucker was first listed on October 23, 1991 (56 FR 54957). It is currently designated as endangered throughout the entire range.

The USFWS designated 15 reaches of the Colorado River system as critical habitat for the razorback sucker. These reaches total 2,776 km (1,724 mi) as measured along the center line of the river within the subject reaches. Designated critical habitat makes up about 49% of the

species' original range and occurs in both the Upper and Lower Colorado River Basins (USFWS 1994). In the Upper Basin, critical habitat is designated for portions of the Green, Yampa, Duchesne, Colorado, White, Gunnison, and San Juan Rivers. Portions of the Colorado, Gila, Salt, and Verde Rivers are designated in the Lower Basin. Critical habitat was designated for razorback sucker on March 21, 1994 (59 FR 13374). The primary constituent elements are the same as those described for Colorado pikeminnow.

Life History and Population Dynamics

McAda and Wydoski (1980) and Tyus (1987) reported springtime aggregations of razorback suckers in off-channel habitats and tributaries; such aggregations are believed to be associated with reproductive activities. Tyus and Karp (1990) and Osmundson and Kaeding (1991) reported off-channel habitats to be much warmer than the mainstem river and that razorback suckers presumably moved to these areas for feeding, resting, sexual maturation, spawning, and other activities associated with their reproductive cycle. Prior to construction of large mainstem dams and the suppression of spring peak flows, low velocity, off-channel habitats (seasonally flooded bottomlands and shorelines) were commonly available throughout the Upper Basin (Tyus and Karp 1989, Osmundson and Kaeding 1991). Dams changed riverine ecosystems into lakes by impounding water, which eliminated these off-channel habitats in reservoirs. Reduction in spring peak flows eliminates or reduces the frequency of inundation of off-channel habitats. The absence of these seasonally flooded riverine habitats is believed to be a limiting factor in the successful recruitment of razorback suckers in their native environment (Tyus and Karp 1989, Osmundson and Kaeding 1991). Wydoski and Wick (1998) identified starvation of larval razorback suckers due to low zooplankton densities in the main channel and loss of floodplain habitats which provide adequate zooplankton densities for larval food as one of the most important factors limiting recruitment.

These fish can spawn as early as age 3 or 4, when they are 14 or more inches long. Depending on water temperature, spawning can take place as early as November or as late as June. In the upper Colorado River basin, razorbacks typically spawn between mid-April and mid-June. These fish reportedly migrate long distances to spawn, congregating in large numbers in spawning areas. While razorback suckers have never been directly observed spawning in turbid riverine environments within the Upper Basin, captures of ripe specimens (in spawning condition), both males and females, have been recorded (Valdez et al. 1982, McAda and Wydoski 1980, Tyus 1987, Osmundson and Kaeding 1989, Tyus and Karp 1989, Tyus and Karp 1990, Osmundson and Kaeding 1991, Platania 1990) in the Yampa, Green, Colorado, and San Juan rivers. Sexually mature razorback suckers are generally collected on the ascending limb of the hydrograph from mid-April through June and are associated with coarse gravel substrates (depending on the specific location).

Outside of the spawning season, adult razorback suckers occupy a variety of shoreline and main channel habitats including slow runs, shallow to deep pools, backwaters, eddies, and other relatively slow velocity areas associated with sand substrates (Tyus 1987, Tyus and Karp 1989, Osmundson and Kaeding 1989, Valdez and Masslich 1989, Osmundson and Kaeding 1991, Tyus and Karp 1990).

Habitat requirements of young and juvenile razorback suckers in the wild are not well known, particularly in native riverine environments. Prior to 1991, the last confirmed documentation of a razorback sucker juvenile in the Upper Basin was a capture in the Colorado River near Moab, Utah (Taba et al. 1965). In 1991, two early juvenile (36.6 and 39.3 mm total length (TL)) razorback suckers were collected in the lower Green River near Hell Roaring Canyon (Gutermuth et al. 1994). Juvenile razorback suckers have been collected in recent years from Old Charley Wash, a wetland adjacent to the Green River (Modde 1996). Between 1992 and 1995 larval razorback suckers were collected in the middle and lower Green River and within the Colorado River inflow to Lake Powell (Muth 1995). In 2002, eight larval razorback suckers were collected in the Gunnison River (Osmundson 2002). No young razorback suckers have been collected in recent times in the Colorado River.

The razorback suckers are adapted to the widely fluctuating physical environment of the historical Colorado River. Adults can live 44-50 years and, once reaching maturity between two and seven years of age (Minckley 1983), apparently produce viable gametes even when quite old. Survival adaptations included the ability to spawn in a variety of habitats and flows regimes, and over a long season. In the event of several consecutive years with little or no recruitment (due to either too much or too little water), the demographics of the population as a whole might shift, but future reproduction would not be compromised. Average fecundity recorded in studies ranged from 100,800 to 46,740 eggs per female (Bestgen 1990). With varying age of maturity and the fecundity of the species, historically it would have been possible to quickly repopulate after a catastrophic loss of adults.

Status and Distribution

On March 14, 1989, the USFWS was petitioned to conduct a status review of the razorback sucker. Subsequently, the razorback sucker was designated as endangered under a final rule published on October 23, 1991 (56 FR 54957). The final rule stated "Little evidence of natural recruitment has been found in the past 30 years, and numbers of adult fish captured in the last 10 years demonstrate a downward trend relative to historic abundance. Significant changes have occurred in razorback sucker habitat through diversion and depletion of water, introduction of nonnative fishes, and construction and operation of dams" (56 FR 54957). Recruitment of razorback suckers to the population continues to be a problem.

Historically, razorback suckers were found in the mainstem Colorado River and major tributaries in Arizona, California, Colorado, Nevada, New Mexico, Utah, Wyoming, and in Mexico (Ellis 1914, Minckley 1983). Bestgen (1990) reported that this species was once so numerous that it was commonly used as food by early settlers and, further, that commercially marketable quantities were caught in Arizona as recently as 1949. In the Upper Basin, razorback suckers were reported in the Green River to be very abundant near Green River, Utah, in the late 1800s (Jordan 1891). An account in Osmundson and Kaeding (1989) reported that residents living along the Colorado River near Clifton, Colorado, observed several thousand razorback suckers during spring runoff in the 1930s and early 1940s. In the San Juan River drainage, Platania and Young (1989) relayed historical accounts of razorback suckers ascending the Animas River to Durango, Colorado, around the turn of the century.

Currently, the largest concentration of razorback sucker remaining in the Colorado River Basin is in Lake Mohave on the border of Arizona and California. Estimates of the wild stock in Lake Mohave have fallen precipitously in recent years from 60,000 as late as 1991, to 25,000 in 1993 (Marsh 1993, Holden 1994), to about 9,000 in 2000 (USFWS 2002b). Until recently, efforts to introduce young razorback sucker into Lake Mohave have failed because of predation by non-native species (Minckley et al. 1991, Clarkson et al. 1993, Burke 1994). While limited numbers of razorback suckers persist in other locations in the Lower Colorado River, they are considered rare or incidental and may be continuing to decline.

In the Upper Colorado River Basin, above Glen Canyon Dam, razorback suckers are found in limited numbers in both lentic (lake-like) and riverine environments. The largest populations of razorback suckers in the upper basin are found in the upper Green and lower Yampa rivers (Tyus 1987). In the Colorado River, most razorback suckers occur in the Grand Valley area near Grand Junction, Colorado; however, they are increasingly rare. Osmundson and Kaeding (1991) reported that the number of razorback sucker captures in the Grand Junction area has declined dramatically since 1974. Between 1984 and 1990, intensive collecting effort captured only 12 individuals in the Grand Valley (Osmundson and Kaeding 1991). The wild razorback sucker population is considered extirpated from the Gunnison River (Burdick and Bonar 1997).

Razorback suckers are in imminent danger of extirpation in the wild. The virtual absence of any recruitment suggests a combination of biological, physical, and/or chemical factors that may be affecting the survival and recruitment of early life stages of razorback suckers. Within the Upper Basin, recovery efforts endorsed by the Recovery Program include the capture and removal of razorback suckers from all known locations for genetic analyses and development of discrete brood stocks. These measures have been undertaken to develop refugia populations of the razorback sucker from the same genetic parentage as their wild counterparts such that, if these fish are genetically unique by subbasin or individual population, then separate stocks will be available for future augmentation. Such augmentation may be a necessary step to prevent the extinction of razorback suckers in the Upper Basin. Razorback suckers will be stocked until at least 2010, current population estimates that stocking will likely continue after that date as well (Thomas Czaplá, personal communication).

Environmental Baseline

Status of the Species within the Action Area

Within or near the Monticello planning area, the razorback sucker currently occupies parts of the Green River Subbasin and the Upper Colorado River Subbasin (Upper Colorado River), and the San Juan River Subbasin (San Juan River) (USFWS 2002; 54 FR 54967; 54 FR 13374).

In the Upper Colorado River subbasin, the number of razorback sucker captured has decreased dramatically since 1974. There are only a few scattered adults in the mainstem Colorado River (Osmundson and Kaeding 1991). During a 2-year study (1979–1981), Valdez et al. (1982) captured only 52 individuals, all old adults, in a 465-km reach of the Colorado River from Rifle, Colorado, to Hite, Utah. No young razorback sucker have been captured anywhere in the upper Colorado River since the mid-1960s (Osmundson and Kaeding 1991).

The Monticello planning area contains both populations and USFWS designated critical habitat for the razorback sucker. This species is endemic to the Colorado River basin. Populations have been identified in the Colorado River from Rifle, Colorado to Lee's Ferry, Arizona and also in the San Juan River from Shiprock, New Mexico, to the inflow of Lake Powell because populations are being re-established through stocking. The natural populations of these fish are mostly aged adults with little or no recruitment.

A Recovery Plan for this species was completed in 1998 and amended in 2002 (USFWS 1998b, 2002d). In addition, the BLM is party to the UCRRP, a Cooperative Agreement with other federal and state agencies, water users, energy distributors, and environmental groups to recover the razorback sucker and other fish in the Upper Colorado River Basin (USFWS 2002d). This agreement includes provisions for protection of instream flow protection, habitat restoration, reduction of nonnative fish species, research, monitoring, and management (USFWS 2002d). Under the authority of current Utah BLM LUPs, the BLM provides species-specific guidance, intended to avoid, minimize, or reduce the potential adverse impacts from implementation of BLM actions on the razorback sucker (USFWS 2006a).

Factors Affecting Species Environment within the Action Area

The primary threats to razorback sucker are stream flow regulation and habitat modification; competition with and predation by nonnative fishes; and pesticides and pollutants (USFWS 2002b). The existing habitat, altered by these threats, has been modified to the extent that it impairs essential behavior patterns, such as breeding, feeding, and sheltering. The threats to razorback sucker are essentially the same threats identified for Colorado pikeminnow.

Management actions identified in the recovery goals for razorback sucker (USFWS 2002b) to minimize or remove threats to the species included:

- provide and legally protect habitat (including flow regimes necessary to restore and maintain required environmental conditions) necessary to provide adequate habitat and sufficient range for all life stages to support recovered populations;
- provide passage over barriers within occupied habitat to allow unimpeded movement and, potentially, range expansion;
- investigate options for providing appropriate water temperatures in the Gunnison River;
- minimize entrainment of subadults and adults in diversion/out-take structures;
- ensure adequate protection from overutilization;
- ensure adequate protection from diseases and parasites;
- regulate nonnative fish releases and escapement into the main river, floodplain, and tributaries;
- control problematic nonnative fishes as needed;
- minimize the risk of hazardous-materials spills in critical habitat;
- remediate water-quality problems; and
- minimize the threat of hybridization with white sucker.

Effects of the Action

Cultural Resources Management

This program includes surveys, inventories, excavation activities, surface material collection, and interpretive site development. Surveys may involve multiple people and vehicles and can last up to several weeks. Inventories for cultural resources commonly entail the use of hand tools, power tools, or heavy machinery.

Surface-disturbing actions under this program could result in soil erosion and removal of upland vegetation within watersheds containing listed fish species could result in increased erosion and sediment that degrade water quantity (reducing ground water discharge into the stream, river, or lake) and water quality (changes in water chemistry, such as pH and dissolved oxygen; temperature; sediment loads; and nutrient availability). These changes in water quantity or quality can directly or indirectly affect listed fish species. Cultural resource activities may negatively affect the primary constituent elements for the Colorado River fish species designated critical habitat. Increased erosion may degrade water quality and increase sediment in the water. This could increase water temperature, decrease food supply, increase turbidity, and deplete oxygen. This could alter a specific hydraulic water regime which is required by a particular life stage for each species. In doing so, there may be decreases in quantity and quality of breeding, spawning, and nursery habitats and degradation of foraging habitats. As a result, there may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult).

Paleontological Resources Management

This program includes surveys, inventories, excavation activities, surface material collection, and interpretive site development. Surveys may involve multiple people and vehicles and can last up to several weeks. Inventories for paleontological resources commonly entail the use of hand tools, power tools, or heavy machinery.

Surface-disturbing actions under this program could result in soil erosion and removal of upland vegetation within watersheds containing listed fish species could result in increased erosion and sediment that degrade water quantity (reducing ground water discharge into the stream, river, or lake) and water quality (changes in water chemistry, such as pH and dissolved oxygen; temperature; sediment loads; and nutrient availability). These changes in water quantity or quality can directly or indirectly affect listed fish species. Cultural resource activities may negatively affect the primary constituent elements for the Colorado River fish species designated critical habitat. Increased erosion may degrade water quality and increase sediment in the water. This could increase water temperature, decrease food supply, increase turbidity, and deplete oxygen. This could alter a specific hydraulic water regime which is required by a particular life stage for each species. In doing so, there may be decreases in quantity and quality of breeding, spawning, and nursery habitats and degradation of foraging habitats. As a result, there may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult).

Fire Management

Objectives of fire management are to protect life, property, and resources values from wildfire and restore the natural role of fire in the ecosystem. Major activities associated with the BLM's fire management program include: wildfire suppression, wildland fire use, prescribed burning, non-fire fuels treatments (mechanical and chemical), and emergency stabilization and rehabilitation following wildfires. Fire suppression methods may involve: fireline construction, use of fire suppression agents and retardants, and water withdrawals.

Increased vegetation disturbance or vegetation removal to support fire suppression activities or fires (wildland or prescribed), fire retardant or chemical treatment to vegetation, soil disturbance, and water removal may adversely impact Colorado fish. Associated impacts may include loss of vegetation cover; soil stability and forage base; and changes to water chemistry, water temperature, and nutrient levels, negatively affecting the primary constituent elements for Colorado fish species. As a result, there may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult).

Health and Safety Management

The primary objective of health and safety management is to protect public and environmental health and safety on lands administered by BLM. Hazardous materials and waste management policies are integrated into all programs. Several federal, state, and local laws overlap in their requirement of BLM to identify and remediate contaminated sites on public lands. Besides managing pre-existing contamination, BLM seeks to prevent or minimize contamination caused by authorized actions.

Activities conducted under the health and safety program include providing warnings, securing and disposing of hazardous waste discharged on public lands, establishing precautions, and responding to emergencies. Activities may involve increased human presence, use of heavy equipment, and removal of contaminated soils. These activities have the potential to occur in locations where mineral development or transport occurs.

Activities occurring under this program may increase human presence, equipment and vehicle use, vegetation treatment or disturbance, and surface disturbance in drainages of Colorado River fish habitat. Associated impacts from vegetation disturbances or vegetation removal (including chemical treatment of vegetation) include: increased invasive plant species, adversely affects on: cover, soil stability, forage base, water chemistry, water temperature, and nutrient levels. Pollutants in the area may decrease water quality and adversely impact the forage base. As a result, there may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult). Other indirect, adverse effects to special status fish species and their habitat include temporary, localized, and downstream water quality degradation, while indirect, beneficial effects of health and safety management decisions include the reduction of water toxicants and sediment over time. Health and safety management decisions may negatively affect the primary constituent elements for the Colorado River fish species designated critical habitat. Increased erosion associated with surface disturbance may degrade water quality and increase sediment in the water. This could increase water temperature, decrease food supply, increase turbidity, and deplete oxygen. This could alter a specific hydraulic water regime which is required by a particular life stage for each species. As a result

there may be decreases in quantity and quality of breeding, spawning, and nursery habitats and degradation of foraging habitats. In consequence, there may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult).

Lands and Realty Management

Objectives of the lands and realty management program are to support multiple-use management goals of the BLM resource programs; respond to public requests for land use authorizations, sales, and exchanges; and acquire and designate rights of way access to serve administrative and public needs. Realty management authorizes occupancy of public lands for roads, power lines, pipelines, communication sites, and irrigation ditches authorized by granting rights of way. Rights of way management actions respond to public requests for access, land authorizations, sales, and exchanges. These rights of way may be temporary or extend up to 30 years, or even in perpetuity.

Activities occurring under this program may increase human presence, equipment and vehicle use, vegetation disturbance, and surface disturbance in the drainages of Colorado River fish habitats. These activities may result in direct water channel disturbance, vegetation disturbance or removal, increased occurrence of invasive plant species, and soil disturbance. Lands and realty management decisions may negatively affect the primary constituent elements for the Colorado River fish species designated critical habitat. Direct stream disturbances may adversely change the water channel morphology, structure, and water quality. Vegetation disturbances or removal (including chemical treatment of vegetation), may adversely affect cover, soil stability, forage base, water chemistry, water temperature, and nutrient levels. Pollutants in the area may decrease water quality and adversely impact the forage base. Land exchanges or disposals may fragment the watersheds in the action area, increasing the previously mentioned impacts. As a result, there may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult).

Livestock Grazing Management

The objective of livestock grazing management is to maintain or improve forage production and range condition as a sustainable resource base for livestock grazing on BLM land. Livestock management includes designating the kind and class of livestock, seasons of use, locations of use and the numbers of livestock that are permitted to use BLM lands.

Activities occurring under this program may increase equipment and vehicle use, vegetation disturbance, and surface disturbance in the drainages of Colorado River fish habitats. These activities may result in vegetation disturbance, removal, alteration; and soil disturbance. Vegetation alteration or removal may decrease: cover, soil stability, stream morphology, forage base, water chemistry, water temperature, and nutrient levels. Livestock management decisions may negatively affect the primary constituent elements for the Colorado River fish species designated critical habitat. Increased erosion associated with surface disturbance may degrade water quality and increase sediment in the water. This could increase water temperature, decrease food supply, increase turbidity, and deplete oxygen. This could alter a specific hydraulic water regime which is required by a particular life stage for each species. As a result,

there may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult).

Minerals Management

The planning area will be open to consideration for exploration, leasing, and development of leasable minerals (oil, gas, coal, tar sands), salable minerals (sand, gravel, clay, and stone) and locatable materials (uranium, gold, copper, and limestone). Although stipulations or conditions may be included in the terms of these mineral contracts, there are potential impacts associated with these various activities. Mineral exploration and extraction often results in surface disturbance from road and facility construction, removal of topsoil and overburden, stock piling of these materials, and post-mining reclamation and recontouring.

Activities occurring under this program may increase human presence, equipment use, and surface disturbance in Colorado River fish habitat. These actions may increase the occurrence of chemical leaks into drainages, vegetation disturbances or removal, soil disturbances, increased occurrence of invasive plant species, and pollutants in drainages of Colorado fish habitat. Vegetation disturbances or vegetation removal (including chemical treatment of vegetation), and increased invasive plant species may adversely affect cover, soil stability, forage base, water chemistry, water temperature, and nutrient levels. Pollutants in the area may affect Colorado River fish by decreasing water quality and impacting the forage base. Lethal and sublethal impacts may result from chemical spills. There may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult).

Recreation Management

The recreation program includes providing for and managing recreational access, developing and maintaining recreation areas, issuing special recreation permits, providing information to the public about recreational resources, and assessing effects of recreational use on the natural resources. Under this program, OHV use, camping, rafting, hiking, fishing, boating, swimming, and other activities are allowed in designated areas.

Activities occurring under this program may increase human presence, equipment and vehicle use, vegetation disturbance, and surface disturbance in the drainages of Colorado River fish habitats. These activities may result in direct water channel disturbance, vegetation disturbance or removal, increased occurrence of invasive plant species, and soil disturbance. Direct stream disturbances may adversely change the water channel morphology, structure, and water quality. Vegetation disturbances or removal (including chemical treatment of vegetation), may adversely affect: cover, soil stability, forage base, water chemistry, water temperature, and nutrient levels. Pollutants in the area may decrease water quality and adversely impact the forage base. As a result, there may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult).

Riparian Management

The objective of riparian management in Utah is to establish an aggressive riparian area management program that will identify, maintain, restore, and/or improve riparian values to achieve a healthy and productive ecological condition for maximum long-term benefits in order

to provide watershed protection while still preserving quality riparian dependent aquatic and terrestrial species habitats and, as appropriate, allow for reasonable resource uses. Priority for riparian area management will be given to areas identified as habitat for aquatic species with signed Conservation Agreements and Strategies.

Activities occurring under this program may increase human presence, equipment and vehicle use, vegetation disturbance, and surface disturbance in the drainages of Colorado River fish habitats. These activities may result in direct water channel disturbance, vegetation disturbance or removal, increased occurrence of invasive plant species, and soil disturbance. Direct stream disturbances may adversely change the water channel morphology, structure, and water quality. Vegetation disturbances or removal (including chemical treatment of vegetation), may adversely affect: cover, soil stability, forage base, water chemistry, water temperature, and nutrient levels. Pollutants in the area may decrease water quality and adversely impact the forage base. As a result, there may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult).

Soils and Watershed Resources

The objectives for the soil and watershed resources management program are to maintain and improve soil integrity, and long-term soil productivity through implementation of rangeland health standards and other soil protection measures, as well as to protect, maintain or improve surface and groundwater quality consistent with existing and anticipated uses and applicable state and federal water quality standards and to provide for availability of water to facilitate authorized uses.

Activities occurring under this program may increase human presence, equipment and vehicle use, vegetation disturbance, and surface disturbance in the drainages of Colorado River fish habitats. These activities may result in direct water channel disturbance, vegetation disturbance or removal, increased occurrence of invasive plant species, and soil disturbance. Direct stream disturbances may adversely change the water channel morphology, structure, and water quality. Vegetation disturbances or removal (including chemical treatment of vegetation), may adversely affect: cover, soil stability, forage base, water chemistry, water temperature, and nutrient levels. Pollutants in the area may decrease water quality and adversely impact the forage base. As a result, there may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult).

Special Designations

This program is responsible for the management of special designated areas including Areas of Critical Environmental Concern (ACEC); Wild and Scenic Rivers (WSR); and Wilderness Resources which include Wilderness Study Areas (WSAs), and congressionally designated Wilderness. Generally, designation of an area results in implementation of conservation measures and timing stipulations that are beneficial to wildlife species.

Activities occurring under this program may increase human presence, equipment and vehicle use, vegetation disturbance, and surface disturbance in the drainages of Colorado River fish habitats. These activities may result in direct water channel disturbance, vegetation disturbance or removal, increased occurrence of invasive plant species, and soil disturbance. Direct stream

disturbances may adversely change the water channel morphology, structure, and water quality. Vegetation disturbances or removal (including chemical treatment of vegetation), may adversely affect: cover, soil stability, forage base, water chemistry, water temperature, and nutrient levels. Pollutants in the area may decrease water quality and adversely impact the forage base. As a result, there may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult).

Travel Management

The objectives of the transportation management program include maintenance of access for public and administrative needs; establishment of a route system that contributes to protection of sensitive resources; accommodates a variety of uses and minimizes user conflicts; and coordination of OHV management.

Activities occurring under this program may increase human presence, equipment and vehicle use, vegetation disturbance, and surface disturbance in the drainages of Colorado River fish habitats. These activities may result in direct water channel disturbance, vegetation disturbance or removal, increased occurrence of invasive plant species, and soil disturbance. Direct stream disturbances may adversely change the water channel morphology, structure, and water quality. Vegetation disturbances or removal (including chemical treatment of vegetation), may adversely affect: cover, soil stability, forage base, water chemistry, water temperature, and nutrient levels. Pollutants in the area may decrease water quality and adversely impact the forage base. As a result, there may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult).

Vegetation Management

Program objectives are to maintain or improve the diversity of plant communities to support timber production, livestock needs, wildlife habitat, watershed protection, and acceptable visual resources. Therefore, this program includes mechanical, chemical, biological, cultural vegetation management methodologies. These management methodologies may result in ground disturbing activities, chemical impacts, human disturbances, and impacts to vegetation from biological management techniques.

Activities occurring under this program may increase human presence, equipment and vehicle use, vegetation treatment or disturbance (mechanical, chemical, biological), and surface disturbance in drainages of Colorado River fish habitats. These activities may result in vegetation disturbance or removal, adverse chemical treatment to vegetation, increased occurrence of invasive plant species, and soil disturbance. Vegetation disturbances, vegetation removal, chemical treatment of vegetation, or increased invasive plant species may adversely affect availability of riparian vegetation cover and water quality. In doing so, there may be decreases in quantity and quality of breeding, spawning, and nursery habitats and degradation of foraging habitats. As a result, there may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult).

Wildlife and Fisheries Management

This program aims to maintain biological diversity, improve habitat for wildlife and fisheries, and provide habitats for threatened and endangered species.

Activities occurring under this program may increase equipment and vehicle use, vegetation treatment or disturbance, and surface disturbance in drainages of Colorado River fish habitats. In the short-term, vegetation disturbances or vegetation removal may adversely affect availability of riparian vegetation, thereby impacting the watershed stability, vegetation cover, forage base, and water quality. Long-term benefits may include: increased bank stability, availability of habitat, and forage base. As a result of short-term and long-term effects, Colorado River fishes may have increased reproductive success and increased survival at all life stages.

Woodlands Management

Woodlands management objectives are to maintain and enhance the health, productivity, sustainability, and biological diversity of forest and woodland ecosystems and to provide a balance of natural resource benefits and uses, including opportunities non-commercial harvest of forest and woodland products on a sustainable basis. The BLM manages forests for multiple uses, such as recreation, livestock grazing, wildlife habitat.

Activities occurring under this program may increase human presence, equipment and vehicle use, vegetation treatment or disturbance, and surface disturbance in drainages of Colorado River fish habitats. Associated impacts include: vegetation disturbance or removal, adverse chemical treatment to vegetation, increased occurrence of invasive plant species, and soil disturbance. Vegetation disturbances, vegetation removal, chemical treatment of vegetation, or increased invasive plant species may adversely affect availability of riparian vegetation cover and water quality. In doing so, there may be decreases in quantity and quality of breeding, spawning, and nursery habitats and degradation of foraging habitats. As a result, there may be decreases in reproductive success, and decreases in survival at all life stages (egg, larval, young of year, juvenile, and adult).

Water Depletions

Water depletions from the Upper Colorado River Basin are a major factor in the decline of the threatened and endangered Colorado River fish. The USFWS determined that any depletion will jeopardize their continued existence and will likely contribute to the destruction or adverse modification of their critical habitat (USDI, Fish and Wildlife Service, Region 6 Memorandum, dated July 8, 1997). However, the Recovery Program was established specifically to offset the negative effects of water depletions to the endangered fish populations, and to act as the Reasonable and Prudent Alternative for these depletions. Actual water depletions will be determined, and Section 7 consultation reinitiated on a project-specific basis.

Cumulative Effects for the Bonytail, Colorado Pikeminnow, Humpback Chub, and Razorback Sucker

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future

Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

Cumulative effects to bonytail, Colorado pikeminnow, humpback chub, and razorback sucker under the Proposed Actions would include, but are not limited to, the following broad types of impacts:

- Changes in land use patterns that would further fragment, modify, or destroy potential spawning sites or designated critical habitat.
- Shoreline recreational activities and encroachment of human development that would remove upland or riparian/wetland vegetation and potentially degrade water quality.
- Competition with, and predation by, exotic fish species introduced by anglers or other sources.
- Program management actions that would reduce the potential for catastrophic wildland fires, vegetation loss, and negative changes to water quality by some, or all, of the following groups, on lands adjoining or upstream of BLM-administered lands:
 - State of Utah
 - County Governments in Utah
 - Local Governments in Utah
 - Private landholders in Utah

Colorado fishes occur throughout the Upper Colorado River Basin of the action area for the proposed RMP amendment. The watersheds affecting Colorado fishes include a checkerboard pattern of land ownership including Federal, State, and private landowners. Colorado fishes are susceptible to activities on State and private lands. Many of these activities, such as livestock grazing; research; construction and operation of dams along major waterways; water retention, diversion, or dewatering of springs, wetlands, or streams; oil and gas exploration and development; human population expansion and associated infrastructure (increased trails and roads); and recreation activities (e.g. off-road vehicles), are expected to continue on State and private lands within the Colorado fishes' range. Contributing as cumulative effects to the proposed action, these activities will continue to affect Colorado fishes' persistence with impacts to staging areas, spawning habitats, nursery habitats, and foraging habitat (including designated critical habitat), further degrading habitat, and increasing non-native fish populations.

Conclusion for the Bonytail, Colorado Pikeminnow, Humpback Chub, and Razorback Sucker

The conclusions of this biological opinion are based on full implementation of the project as described in the "Description of the Proposed Action" section of this document, including the resource protection measures that were incorporated into the project design.

It is our opinion that the proposed action are not likely to jeopardize the continued existence of the Colorado River Fishes, and are not likely to jeopardize the continued existence of these species or adversely modify their habitat. We base our conclusion on the following:

1. Treatment sizes will be limited during any single year, both in space and time, in the species range. Vegetation removed during project related activities will not impact large

portions of the Upper Colorado River Basin and, with conservation measures applied, are not expected to significantly affect water quality or flows to impact the bonytail or its critical habitat.

2. In addition, the Recovery Programs for the endangered Colorado River fishes conduct intensive fish community monitoring throughout the potentially affected area. The USFWS is a participant on both programs and we believe that those monitoring programs, although not specifically designed to determine cause and affect relationships, will provide useful information to assess site-specific projects under the proposed action. The USFWS will rely heavily on the results of Recovery Program monitoring to determine if additional Section 7 consultation is required.
3. The applicant committed resource protection measures will be incorporated into site-specific projects designed under the BLM Resource Management Plan. If project design cannot adhere to all applicant committed resource protection measures, consultation under Section 7 of the Endangered Species Act will be initiated.
4. All site-specific projects designed under the proposed Resource Management Plan would be subject to consultation requirements under Section 7 of the Endangered Species Act.

EXPERIMENTAL POPULATIONS SPECIES FOUND IN THE ACTION AREA

California condor (*Gymnogyps californianus*)

Status of the Species

Species / Critical Habitat Description

The California condor is a member of the family Cathartidae, the New World vultures, a family of seven species, including the closely related Andean condor (*Vultur gryphus*) and the sympatric turkey vulture (*Cathartes aura*) (61 FR 54043). California condors are among the largest flying birds in the world (USFWS 1996; 61 FR 54043). Adults weigh approximately 10 kilograms (22 pounds) and have a wing span up to 2.9 meters (9.5 feet) (61 FR 54043). Adults are black except for prominent white underwing linings and edges of the upper secondary coverts. The head and neck are mostly naked, and the bare skin is gray, grading into various shades of yellow, red, and orange. Males and females cannot be distinguished by size or plumage characteristics. The heads of juveniles up to 3 years old are grayish black, and their wing linings are variously mottled or completely dark. During the third year the head develops yellow coloration, and the wing linings become gradually whiter (N.J. Schmitt in litt. 1995; 61 FR 54043). By the time individuals are 5 or 6 years of age, they are essentially indistinguishable from adults (Koford 1953; Wilbur 1975; Snyder et al. 1987; 61 FR 54043), but full development of the adult wing patterns may not be completed until 7 or 8 years of age (N.J. Schmitt in litt. 1995; 61 FR 54043). Habitat includes caves, cliffs and steep slopes.

Life History and Population Dynamics

Condors reach sexual maturity by 5 to 6 years of age and breeding occurs between 6 and 8 years of age. Courtship and nest site selection occurs from December through the spring (USFWS

1996). Nest sites include: caves, cliffs, or a crevice among boulders on a steep slope. Breeding California condors normally lay a single egg between late January and early April, every other year (USFWS 1996). The condor provides an extensive amount of parental care and the average incubation period for a condor egg is about 56 days (USFWS 1996). Both parents share responsibilities for feeding the nestling. Fledging occurs at six months of age; however, juvenile condors may be dependent on their parents for more than a year (Peregrine Fund, Calif. Condor 2005). The California condor life span is unknown, but may possibly extend up to 60 years (San Diego Zoo 2005). Condors are strict scavengers. Unlike turkey vultures, condors do not have an exceptional sense of smell (National Park Service 2005). They locate their food visually, often by investigating the activity of ravens, coyotes, eagles, and other scavengers. Without the guidance of their parents, young inexperienced juvenile condors may also investigate the activity of humans. As young condors learn and mature this human directed curiosity diminishes (National Park Service 2005).

Status and Distribution

The California condor (*Gymnogyps californianus*) was listed as endangered on March 11, 1967 (32 FR 4001). California condors remain one of the world's rarest and most imperiled vertebrate species (Cooper 1890; Koford 1953; Wilbur 1978) with California being listed as the only critical habitat. Fossil records indicate that California condors once ranged over much of the southern United States. The main reason for the decline of the condors is an unsustainable mortality rate of free-flying birds combined with a naturally low reproductive rate.

Despite intensive conservation efforts, the wild California condor population declined steadily until 1987, when the last free-flying individual was captured. During the 1980s, captive condor flocks were established at the San Diego Wild Animal Park and the Los Angeles Zoo, and the first successful captive breeding was accomplished at the former facility in 1988. Following several years of increasingly successful captive breeding, captive-produced condors were first released back to the wild in California in early 1992. "On October 6, 1996, the USFWS announced its intention to reintroduce California condors into northern Arizona and southern Utah, and designate the released birds as a nonessential, experimental population (NEP) under Section 10(j) of the ESA (61 FR 54043). On October 29, 1996, six California condors were released at the Vermilion Cliffs in Coconino County of northern Arizona. Since then, additional birds have been released. The designated experimental population area (ExPA) includes remote federal (BLM, USFS, and NPS) and Native American Reservation lands, and some private lands in northern Arizona, southern Utah and southeastern Nevada (61 FR 54043). The primary release site and current nesting sites occur at Grand Canyon National Park and Vermilion Cliffs, Arizona" (Diana Whittington, personal communication).

Environmental Baseline

Status of the Species within the Action Area

The California condor is a federally-listed endangered species with non-essential, experimental status in Utah south of Interstate 70 and west of Highway 191. Condors that travel north of Interstate 70 and east of Highway 191 are not considered part of the non-essential experimental population, and are listed as endangered. Highway 191 runs through the eastern portion of the action area. Approximately 1/3 of the action area is east of this boundary.

California condors have been identified as far North as Flaming Gorge for foraging and traveling and have likely traveled across the planning area. Regular sightings occur in southern Utah, particularly in the vicinity of Zion National Park/Kolob Canyons; condors have not been sighted within the Monticello planning area.

Although California condors have not been specifically identified within the planning area, the following effects determination is written to assess impacts should condors use the planning area more frequently for foraging and possibly for nesting. The RMP planning process is a long-term planning effort, and thus we are analyzing activities for this potential.

Factors Affecting Species Environment within the Action Area

Most California condor deaths in recent years have been directly or indirectly related to human activity. Shootings, poisoning, lead poisoning, and collisions with power lines are considered the condors' major threats. In addition, illegal collection of eggs and birds, poisoning from predator control and an increase in roads and houses throughout the open country needed by condors for foraging have contributed to their decline. Their slow rate of reproduction and high number of years spent reaching breeding maturity make the condor population as a whole more vulnerable to these threats.

Effects of the Action

Cultural Resources Management

This program includes surveys, inventories, excavation activities, surface material collection, and interpretive site development. Surveys may involve multiple people and vehicles and can last up to several weeks. Inventories for cultural resources commonly entail the use of hand tools, power tools, or heavy machinery.

Activities occurring under this program may increase human presence; equipment use; and surface disturbance in potential California condor habitat. Associated noise and visual disturbances may adversely affect the behavior of condors during breeding, nesting, roosting, or foraging efforts. Vegetation disturbances or removal associated with cultural resources excavations may reduce availability of prey habitat and prey abundance, at least in the short term. As a result, there may be site-specific decreases in nest initiation or nesting success, and displacement. These effects are likely to be short-term and relatively small scale due to the type of activity.

Paleontological Resources Management

This program includes surveys, inventories, excavation activities, surface material collection, and interpretive site development. Surveys may involve multiple people and vehicles and can last up to several weeks. Inventories for paleontological resources commonly entail the use of hand tools, power tools, or heavy machinery.

Activities occurring under this program may increase human presence; equipment use; and surface disturbance in potential California condor habitat. Associated noise and visual disturbances may adversely affect the behavior of condors during breeding, nesting, roosting, or

foraging efforts. Vegetation disturbances or removal associated with paleontological resources excavations may reduce availability of prey habitat and prey abundance, at least in the short term. As a result, there may be site-specific decreases in nest initiation or nesting success, and displacement. These effects are likely to be short-term and relatively small scale due to the type of activity.

Fire Management

Objectives of fire management are to protect life, property, and resources values from wildfire and restore the natural role of fire in the ecosystem. Major activities associated with the BLM's fire management program include: wildfire suppression, wildland fire use, prescribed burning, non-fire fuels treatments (mechanical and chemical), and emergency stabilization and rehabilitation following wildfires. Fire suppression methods may involve: fireline construction, use of fire suppression agents and retardants, and water withdrawals.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment; and surface disturbance; and decrease local air quality in California condor habitats. Associated noise and visual disturbances may adversely affect the behavior of California condor, and result in displacement during breeding, nesting, roosting, or foraging activities. Vegetation disturbances or vegetation removal may decrease roosting sites, prey habitat, and prey abundance. Soil disturbances and increased erosion may indirectly decrease abundance of prey. Smoke could interfere with visually based flight and foraging, and increased air traffic could result in collisions. As a result of these impacts, there may be site-specific decreases in nest initiation or nesting success, and possible mortality.

Potential impacts from wildland fire use and prescribed fire would be similar to those from wildfire suppression. Non-fire fuels treatments and emergency stabilization and rehabilitation following wildfires may be used to retain or improve range conditions and maintain lower fuel loads in grassland and sagebrush habitats. Negative impacts include harassment or displacement; or immediate post-project alteration of key prey habitat components from surface disturbance. Additionally, these fire management activities could benefit prey populations of California condors in the long-term due to improved forage quality and quantity.

Health and Safety Management

Activities conducted under the health and safety program include providing warnings, securing and disposing of hazardous waste discharged on public lands, establishing precautions, and responding to emergencies. Activities may involve increased human presence, use of heavy equipment, and removal of contaminated soils. These activities have the potential to occur in locations where mineral development or transport occurs.

Mineral developments, pipelines, and roads occur within all of the planning areas analyzed in this document, and have some potential to occur in California condor habitat. Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; and surface disturbance in California condor habitat. Associated noise and visual disturbances may adversely affect the behavior of California condors during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may adversely affect availability of prey habitat. Soil disturbances may increase erosion,

adversely affect soil stability, and adversely impact prey habitat. As a result, there may be decreases in nest initiation or nesting success, and increased mortality.

Lands and Realty Management

Objectives of the lands and realty management program are to support multiple-use management goals of the BLM resource programs; respond to public requests for land use authorizations, sales, and exchanges; and acquire and designate rights of way access to serve administrative and public needs. Realty management authorizes occupancy of public lands for roads, power lines, pipelines, communication sites, and irrigation ditches authorized by granting rights of way. Rights of way management actions respond to public requests for access, land authorizations, sales, and exchanges. These rights of way may be temporary or extend up to 30 years, or even in perpetuity.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; and surface disturbance in California condor habitat. Associated noise and visual disturbances may adversely affect the behavior of California condors during breeding, nesting, or foraging activities. Construction of power lines or other infrastructure may result in electrocutions, entanglements, or collisions with flying birds, resulting in possible mortality. Vegetation disturbances or vegetation removal may adversely affect availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and adversely affect prey habitat. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for California condor prey species. Exchange or sales of lands may lead to habitat fragmentation and loss. As a result, there may be decreases in nest initiation or nesting success, and increased adult nestling/juvenile fitness.

Livestock Grazing Management

The objective of livestock grazing management is to maintain or improve forage production and range condition as a sustainable resource base for livestock grazing on BLM land. Livestock management includes designating the kind and class of livestock, seasons of use, locations of use and the numbers of livestock that are permitted to use BLM lands.

Range management activities may include vegetation treatments such as prescribed fire, mechanical and chemical control of noxious weeds, sagebrush and other target species. The determinations and effects analyses associated with the potential impacts of these treatments can be located under the other appropriate program headings (i.e., fire treatments – see Fire Management, or vegetative treatments – see Vegetation Management). Other range improvements authorized by the livestock grazing management program may include fence construction, water developments, exclosures, and livestock handling facilities.

There are four primary ways livestock manipulate habitats to favor/hinder wildlife species: 1) alteration of vegetation composition, 2) cause increased/decreased productivity of selected plant species, 3) increase/decrease the nutritive quality of available forage, and/or 4) increase/decrease the diversity of habitats by altering structure (Severson and Urness 1994).

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; and surface disturbance in California condor habitat.

Associated noise and visual disturbances may adversely affect the behavior of California condors during breeding, nesting, or foraging activities. Vegetation disturbances, vegetation removal, or vegetation alteration may result in less dense vegetation, more invasive plant species, fragmented prey habitat and adverse effects to availability of prey habitat and prey abundance. Soil disturbances may increase erosion, adversely affect soil stability, and adversely affect prey habitat. As a result, there may be decreases in nest initiation or nesting success, and decreased fitness.

Minerals Management

The planning area will be open to consideration for exploration, leasing, and development of leasable minerals (oil, gas, coal, tar sands), salable minerals (sand, gravel, clay, and stone) and locatable materials (uranium, gold, copper, and limestone). Although stipulations or conditions may be included in the terms of these mineral contracts, there are potential impacts associated with these various activities. Mineral exploration and extraction often results in surface disturbance from road and facility construction, removal of topsoil and overburden, stock piling of these materials, and post-mining reclamation and recontouring.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; surface disturbance; and pollutants in California condor habitat. Associated noise and visual disturbances may adversely affect the behavior of California condors during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may adversely affect availability of quality and quantity of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and decrease prey habitat. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for prey species. Pollutants in the area may affect California condor through adverse effects to prey populations. As a result of these impacts, there may be decreases in nest initiation or nesting success, and decreased adult fitness.

Recreation Management

The recreation program includes providing for and managing recreational access, developing and maintaining recreation areas, issuing special recreation permits, providing information to the public about BLM's recreational resources, and assessing effects of recreational use on the natural resources. Under this program, OHV use, camping, rafting, hiking, fishing, boating, swimming, and other activities are allowed in designated areas.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; and surface disturbance in California condor habitat. Associated noise and visual disturbances may adversely affect the behavior of California condors during breeding, nesting, or foraging activities. Increased human presence, particularly during hunting seasons may indirectly result in increased exposure of condors to carcasses with lead fragments, with the potential for injury or mortality related to lead poisoning. Vegetation disturbances or vegetation removal may adversely affect the availability and quality of prey habitat and prey abundance. Soil disturbances may increase erosion, adversely affect soil stability, and adversely affect prey habitat. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for California condor prey species. As

a result, there may be decreases in nest initiation or nesting success, and decreased adult and nestling/fledgling fitness.

Riparian Management

The objective of riparian management in Utah is to establish an aggressive riparian area management program that will identify, maintain, restore, and/or improve riparian values to achieve a healthy and productive ecological condition for maximum long-term benefits in order to provide watershed protection while still preserving quality riparian dependent aquatic and terrestrial species habitats and, as appropriate, allow for reasonable resource uses. Priority for riparian area management will be given to areas identified as habitat for aquatic species with signed Conservation Agreements and Strategies.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), vegetation treatment or disturbance, and surface disturbance in California condor habitat. Associated noise disturbances may adversely affect the behavior of California condors during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may adversely affect availability of prey habitat and prey abundance. Soil disturbances may increase erosion, adversely affect soil stability, and adversely impact prey habitat. As a result, there may be decreases in nest initiation or nesting success, and decreased adult and nestling/fledgling fitness.

Soils and Watershed Resources

The objectives for the soil and watershed resources management program are to maintain and improve soil integrity, and long-term soil productivity through implementation of rangeland health standards and other soil protection measures, as well as to protect, maintain or improve surface and groundwater quality consistent with existing and anticipated uses and applicable state and federal water quality standards and to provide for availability of water to facilitate authorized uses.

Potential adverse impacts to California condor may result from land treatments occurring within watersheds. Many of these activities are meant to benefit soil resources and watersheds by reducing soil loss and reclaiming surface disturbances or unnecessary roads. However, activities occurring under this program may also increase human presence; equipment and vehicle use; vegetation manipulation; and surface disturbance in condor habitat. Short-term adverse impacts may include, but not be limited to: disruption of normal breeding, nesting, foraging, and roosting behaviors (associated with noise and visual disturbances); and decreased prey habitat. Long-term benefits may include increased nesting success, increased prey abundance, and increased survival due to maintenance and improvement of soil resources.

Travel Management

The objectives of the transportation management program include maintenance of access for public and administrative needs; establishment of a route system that contributes to protection of sensitive resources; accommodates a variety of uses and minimizes user conflicts; and coordination of OHV management.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; surface disturbance; and pollutants in California condor habitat. Associated noise and visual disturbances may adversely affect the behavior of California condors during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may adversely affect availability of quality and quantity of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and decrease prey habitat. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for prey species. Pollutants in the area may affect California condor through adverse effects to prey populations. As a result of these impacts, there may be decreases in nest initiation or nesting success, and decreased adult fitness.

Vegetation Management

Program objectives are to maintain or improve the diversity of plant communities to support timber production, livestock needs, wildlife habitat, watershed protection, and acceptable visual resources. Therefore, this program includes mechanical, chemical, biological, cultural vegetation management methodologies. These management methodologies may result in ground disturbing activities, chemical impacts, human disturbances, and impacts to vegetation from biological management techniques.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance (mechanical, chemical, biological); and surface disturbance in condor habitat. Associated noise and visual disturbances may adversely affect the behavior of condors during breeding, nesting, or foraging activities. Vegetation alteration, removal, or inadvertent chemical treatment may adversely affect availability and quality of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and adversely affect prey species habitat. As a result, there may be site-specific decreases in nest initiation or nesting success.

Wildlife and Fisheries Management

This program aims to maintain biological diversity, improve habitat for wildlife and fisheries, and provide habitats for threatened and endangered species.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; and surface disturbance in California condor habitat. Associated noise and visual disturbances may adversely affect the behavior of condors during breeding, nesting, or foraging activities. Vegetation disturbances or vegetation removal may adversely affect availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, increase sediment deposits, and habitat for prey species. Short-term adverse impacts may include, but not be limited to: fragmented prey habitat; decreases in nest initiation or nesting success; and decreased adult and nestling/juvenile fitness; and alterations of water distribution within occupied habitat of the California condor. In general, long-term efforts to improve the health of riparian habitats may benefit California condors by increasing prey abundance.

Woodland Management

Woodlands management objectives are to maintain and enhance the health, productivity, sustainability, and biological diversity of forest and woodland ecosystems and to provide a balance of natural resource benefits and uses, including opportunities non-commercial harvest of forest and woodland products on a sustainable basis. The BLM manages forests for multiple uses, such as recreation, livestock grazing, wildlife habitat.

Activities occurring under this program may increase human presence; equipment and vehicle use; vegetation treatment or disturbance; and surface disturbance in California condor habitat. Associated noise and visual disturbances may adversely affect the behavior of California condors during breeding, nesting, or foraging activities. Vegetation disturbances, vegetation removal, or chemical treatment of vegetation may adversely affect prey habitat and prey availability, and therefore, adversely affect California condors and their young. Soil disturbances may increase erosion, adversely affect soil stability, and adversely affect prey habitat and prey abundance. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for prey species. As a result, there may be decreases in nest initiation or nesting success, and decreased fitness.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological/conference opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

Cumulative effects to candidate species California condor under the Proposed Actions would include, but are not limited to, the following broad types of impacts:

- Changes in land use patterns or practices that adversely affect a species' suitable or potential habitat.
- Encroachment of human development into a species' suitable or potential habitat.
- Fire management actions by some, or all, of the following groups, on lands adjoining or upstream of BLM-administered lands:
 - State of Utah
 - County Governments in Utah
 - Local Governments in Utah
 - Private landholders in Utah

California condors have the capability to occur throughout the action area. The action area is surrounded by a checkerboard pattern of land ownership including Federal, State, and private landowners. California condors are susceptible to activities on State and private lands. Many of these activities, such as livestock grazing, oil and gas exploration and development, human population expansion and associated infrastructure (increased trails and roads) development, research, and recreation activities (including OHV use and any activities that increase human presence), are expected to continue on State and private lands within the California Condor's range. Contributing as cumulative effects to the proposed action, these activities will continue to

affect California condors' productivity with disturbances to breeding, nesting, and foraging behaviors and further fragmenting habitat of prey populations.

Conclusions

The conclusions of this biological and conference opinion are based on full implementation of the project as described in the "Description of the Proposed Action" section of this document, including the resource protection measures that were incorporated into the project design.

After reviewing the current status of the California condor, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the USFWS's conference opinion that the Monticello BLM Field Office Resource Management Plan, as proposed, is not likely to jeopardize the continued existence of the California condor. In areas outside the experimental, non-essential population boundaries, the Monticello BLM Field Office Resource Management Plan, as proposed, may affect but is unlikely to affect the California condor. Critical habitat has not been designated for this species. We base our conclusion on the following:

1. The applicant committed resource protection measures will be incorporated into site-specific projects designed under the BLM Resource Management Plan. If project design cannot adhere to all applicant committed resource protection measures, consultation under Section 7 of the Endangered Species Act will be initiated.
2. All site-specific projects designed under the proposed BLM Resource Management Plan would be subject to consultation requirements under Section 7 of the Endangered Species Act.

CANDIDATE SPECIES FOUND IN THE ACTION AREA

Western yellow-billed cuckoo (*Coccyzus americanus*)

Status of the Species

Species Description

The western yellow-billed cuckoo is one of two subspecies of the yellow-billed cuckoo (UDWR 2003). The western yellow-billed cuckoo is approximately 12 in (31 cm) in length. The bird is brownish above and white below; with rusty colored flight feathers. The upper mandible of the bill is black and the lower mandible is yellow. The underside of the tail has pairs of large white spots.

The western subspecies is found intermittently throughout the western United States in dense riparian vegetation, including cottonwood and willow stands, tamarisk thickets, Russian olive, willows, and orchards. They primarily consume insects such as caterpillars, cicadas, beetles, grasshoppers, and katydids, as well as lizards, frogs, eggs of other birds, berries, and small fruits.

Life History and Population Dynamics

Yellow-billed cuckoos are one of the latest migrants to arrive and breed in Utah. They arrive in extremely late May or early June and breed in late June through July. Cuckoos typically start their southerly migration by late August or early September. Yellow-billed cuckoos feed almost entirely on large insects that they glean from tree and shrub foliage. They feed primarily on caterpillars, including tent caterpillars. They also feed frequently on grasshoppers, cicadas, beetles, and katydids, occasionally on lizards, frogs, and eggs of other birds, and rarely on berries and fruits (Ehrlich et al. 1988, Kaufmann 1996).

Nesting habitat is classified as dense lowland riparian characterized by a dense sub-canopy or shrub layer (regenerating canopy trees, willows, or other riparian shrubs) within 100 m of water. Over story in these habitats may be either large, gallery-forming trees or developing trees, usually cottonwoods. Nesting habitats are found at low to mid-elevations (750-1820 m) in Utah. Cuckoos may require large tracts (40-80 ha) of contiguous riparian nesting habitat; however, cuckoos are not strongly territorial and home ranges may overlap during the breeding season. Nests are usually 1.2-2.4 m above the ground on the horizontal limb of a deciduous tree or shrub, but nest heights may range from 1-6 m and higher. The nest is a loosely arranged platform of twigs lined with softer materials such as grass, rootlets, and dried leaves. Nests are built in 1-3 days. The female lays 1-8 (usually 3) eggs over a period of several days; laying often begins before the nest is complete. Both males and females incubate eggs for a period of 9-11 days, beginning when the first egg is laid. Nestlings are altricial and hatch asynchronously over several days. Young are brooded by both adults for 7-8 days before leaving the nest, an unusually rapid development for a bird this size. Young climb on branches for about 2 weeks after leaving the nest until they are capable of flight at about 3 weeks of age. Both adults tend the fledglings, and in some cases early fledglings are attended by the male and later fledglings are attended by the female. It is not known whether cuckoos have more than one brood per season in Utah, but multiple brooding has been recorded in California.

Yellow-billed cuckoo nesting behavior may be closely tied to food abundance. In years of low food abundance, cuckoos may forego nesting; in years when the food supply is abundant, cuckoos may lay a large number of eggs and even parasitize the nests of other species (Nolan and Thompson 1975). Cuckoos are rarely hosts to brown-headed cowbirds.

Status and Distribution

In 2001, the western subspecies of the yellow-billed cuckoo was designated as a candidate for listing (threatened or endangered status) under the ESA (66 Federal Register 38611-38626). The USFWS has found that the species population status warrants listing but other, higher priority listing actions prevent them from addressing the cuckoo's status at this time.

This species occurs intermittently across the state. Historically, breeding was recorded in Weber, Salt Lake, Utah, and Washington Counties. Recent breeding has been confirmed in Salt Lake, Grand, and Uintah Counties. Although it is not known to breed throughout the state, it has been recorded in the riparian habitats of the following 14 counties: Wayne, Garfield, Box Elder, Cache, Davis, Salt Lake, Wasatch, Utah, Uintah, Grand, San Juan, Washington, Iron, and Juab. It is considered a candidate for listing in all of Utah's 29 counties except Rich (UDWR 2003).

Environmental Baseline

Status of the Species within the Action Area

The western yellow-billed cuckoo is listed as a candidate species due to loss of riparian habitat from agricultural use, water use, road development, and urban development. This species of cuckoo is a neotropical migrant that utilizes riparian valleys throughout the state. There is potentially suitable habitat in the larger riparian areas throughout the MFO. They have been documented during migration along the San Juan River (Johnson et al. 1998). Not all suitable habitat areas have been surveyed for the yellow-billed cuckoo.

Factors Affecting Species Environment within the Action Area

Threats to the western yellow-billed cuckoo are related to habitat destruction and degradation from the invasion of tamarisk, livestock use of riparian areas, water withdrawals, and human development (UDWR 2003). The availability of suitable western yellow-billed cuckoo habitats in the Monticello region is seriously limited by dry conditions, narrowness of existing riparian zones, grazing and the presence of brown headed cowbirds.

Effects of the Action

Cultural Resources Management

This program includes surveys, inventories, excavation activities, surface material collection, and interpretive site development. Surveys may involve multiple people and vehicles and can last up to several weeks. Inventories for cultural resources commonly entail the use of hand tools, power tools, or heavy machinery.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), and surface disturbance in potential western yellow-billed cuckoo habitat. Noise disturbances may cause avoidance of potential habitat. Vegetation disturbances or removal may decrease the availability of nesting habitat; decrease cover from predators; and decrease the availability of prey habitat. As a result, there may be a decrease in the fitness of adults and nestlings, and potential western yellow-billed cuckoo habitat may become degraded and unable to support this species.

Paleontological Resources Management

This program includes surveys, inventories, excavation activities, surface material collection, and interpretive site development. Surveys may involve multiple people and vehicles and can last up to several weeks. Inventories for paleontological resources commonly entail the use of hand tools, power tools, or heavy machinery.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), and surface disturbance in potential western yellow-billed cuckoo habitat. Noise disturbances may cause avoidance of potential habitat. Vegetation disturbances or removal may decrease the availability of nesting habitat; decrease cover from predators; and decrease the availability of prey habitat. As a result, there may be a

decrease in the fitness of adults and nestlings, and potential western yellow-billed cuckoo habitat may become degraded and unable to support this species.

Fire Management

Objectives of fire management are to protect life, property, and resources values from wildfire and restore the natural role of fire in the ecosystem. Major activities associated with the fire management program include: wildfire suppression, wildland fire use, prescribed burning, non-fire fuels treatments (mechanical and chemical), and emergency stabilization and rehabilitation following wildfires. Fire suppression methods may involve: fireline construction, use of fire suppression agents and retardants, and water withdrawals.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), vegetation treatment or disturbance, and surface disturbance in potential western yellow-billed cuckoo habitat. Associated noise disturbances may cause avoidance of these habitats. Vegetation disturbances or vegetation removal decrease availability of nesting habitat; decrease cover from predator; and decrease prey habitat. As a result, there may be a decrease in the fitness of adults and nestlings, and potential western yellow-billed cuckoo habitat may become degraded and unable to support this species. Long-term benefits of this program, as vegetation is reestablished, may include: increased insect prey abundance and increased potential habitat.

Health and Safety Management

Activities conducted under the hazardous materials program include providing warnings, securing and disposing of hazardous waste discharged on public lands, establishing precautions, and responding to emergencies. Activities may involve increased human presence, use of heavy equipment, and removal of contaminated soils. These activities have the potential to occur in locations where mineral development or transport occurs.

Mineral developments, pipelines, roads, and railroad transportation systems occur within all of the planning areas analyzed in this document, and have the potential to occur in yellow-billed cuckoo habitat. Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), vegetation treatment or disturbance, and surface disturbance in potential yellow-billed cuckoo habitat. Vegetation disturbances or vegetation removal may decrease the availability and quality of nesting habitat; decrease cover from predators; and decrease the availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. As a result, there may be a decrease in the fitness of adults and nestlings, and potential western yellow-billed cuckoo habitat may become degraded and unable to support this species.

Lands and Realty Management

Objectives of the lands and realty management program are to support multiple-use management goals of the BLM resource programs; respond to public requests for land use authorizations, sales, and exchanges; and acquire and designate rights of way access to serve administrative and public needs. Realty management authorizes occupancy of public lands for roads, power lines, pipelines, communication sites, and irrigation ditches authorized by granting rights of way.

Rights of way management actions respond to public requests for access, land authorizations, sales, and exchanges. These rights of way may be temporary or extend up to 30 years, or even in perpetuity.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), vegetation disturbance, and surface disturbance in yellow-billed cuckoo habitat. Vegetation disturbances or vegetation removal may decrease the availability and quality of nesting habitat; decrease cover from predators; and decrease the availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for yellow-billed cuckoo and their prey species. Exchange or sales of lands may lead to habitat fragmentation and loss. As a result, there may be a decrease in the fitness of adults and nestlings, and potential western yellow-billed cuckoo habitat may become degraded and unable to support this species.

Livestock Grazing Management

The objective of livestock grazing management is to maintain or improve forage production and range condition as a sustainable resource base for livestock grazing on BLM land. Livestock management includes designating the kind and class of livestock, seasons of use, locations of use and the numbers of livestock that are permitted to use BLM lands.

Range management activities may include vegetation treatments such as prescribed fire, mechanical and chemical control of noxious weeds, sagebrush and other target species. The determinations and effects analyses associated with the potential impacts of these treatments can be located under the other appropriate program headings (i.e., fire treatments – see Fire Management, or vegetative treatments – see Vegetation Management). Other range improvements authorized by the livestock grazing management program may include fence construction, water developments, exclosures, and livestock handling facilities.

There are four primary ways livestock manipulate habitats to favor/hinder some wildlife species: 1) alteration of vegetation composition, 2) cause increased/decreased productivity of selected plant species, 3) increase/decrease the nutritive quality of available forage, and/or 4) increase/decrease the diversity of habitats by altering structure (Severson and Urness 1994).

Activities occurring under this program may increase human presence (including associated noise disturbances), vegetation disturbance, and minor surface disturbance in yellow-billed cuckoo habitat. Vegetation disturbances, vegetation removal, or vegetation alteration may result in less dense vegetation; an increase in invasive plant species; increased fragmented habitat; reduced availability of nesting habitat; decreased cover from predators; and decreased availability prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. As a result, there may be a decrease in the fitness of adults and nestlings, and potential western yellow-billed cuckoo habitat may become degraded and unable to support this species.

Minerals Management

The planning area will be open to consideration for exploration, leasing, and development of leasable minerals (oil, gas, coal, tar sands), salable minerals (sand, gravel, clay, and stone) and locatable materials (uranium, gold, copper, and limestone). Although stipulations or conditions may be included in the terms of these mineral contracts, there are potential impacts associated with these various activities. Mineral exploration and extraction often results in surface disturbance from road and facility construction, removal of topsoil and overburden, stock piling of these materials, and post-mining reclamation and recontouring.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), surface disturbance, and increased occurrence of chemical leaks in yellow-billed cuckoo habitat. Associated noise disturbances may cause avoidance of potential habitats. Vegetation disturbances or vegetation removal may decrease the availability and quality of nesting habitat; decrease cover from predators; and decrease the availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for yellow-billed cuckoo and their prey species. Pollutants in the area may affect prey populations, and vegetation. As a result, there may be a decrease in the fitness of adults and nestlings, and potential western yellow-billed cuckoo habitat may become degraded and unable to support this species.

Recreation Management

The recreation program includes providing for and managing recreational access, developing and maintaining recreation areas, issuing special recreation permits, providing information to the public about BLM's recreational resources, and assessing effects of recreational use on the natural resources. Under this program, OHV use, camping, rafting, hiking, fishing, boating, swimming, and other activities are allowed in designated areas.

Authorized activities under this program have the potential to increase human presence, equipment and vehicle use (including associated noise disturbances), vegetation disturbance, and surface disturbance in potential yellow-billed cuckoo habitat. Associated noise disturbances may cause avoidance of potential habitat. Vegetation disturbances or vegetation removal may decrease the availability and quality of nesting habitat; decrease cover from predators; and decrease the availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for yellow-billed cuckoo and their prey species. As a result, there may be a decrease in the fitness of adults and nestlings, and potential western yellow-billed cuckoo habitat may become degraded and unable to support this species.

Riparian Management

The objective of riparian management in Utah is to establish an aggressive riparian area management program that will identify, maintain, restore, and/or improve riparian values to achieve a healthy and productive ecological condition for maximum long-term benefits in order to provide watershed protection while still preserving quality riparian dependent aquatic and

terrestrial species habitats and, as appropriate, allow for reasonable resource uses. Priority for riparian area management will be given to areas identified as habitat for aquatic species with signed Conservation Agreements and Strategies.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), surface disturbance, and increased occurrence of chemical leaks in yellow-billed cuckoo habitat. Associated noise disturbances may cause avoidance of potential habitats. Vegetation disturbances or vegetation removal may decrease the availability and quality of nesting habitat; decrease cover from predators; and decrease the availability of prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for yellow-billed cuckoo and their prey species. Pollutants in the area may affect prey populations, and vegetation. As a result, there may be a decrease in the fitness of adults and nestlings, and potential western yellow-billed cuckoo habitat may become degraded and unable to support this species.

Soils and Watershed Resources

The objectives for the soil and watershed resources management program are to maintain and improve soil integrity, and long-term soil productivity through implementation of rangeland health standards and other soil protection measures, as well as to protect, maintain or improve surface and groundwater quality consistent with existing and anticipated uses and applicable state and federal water quality standards and to provide for availability of water to facilitate authorized uses.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), vegetation manipulation, stream alteration, and minor surface disturbance in western yellow-billed cuckoo habitat. Short-term adverse impacts may include, but not be limited to: decreased nesting habitat; decreased cover from predators; decreased prey habitat; and alterations of water distribution within suitable habitat for western yellow-billed cuckoos. As a result, there may be a decrease in the fitness of adults and nestlings, and potential western yellow-billed cuckoo habitat may become degraded and unable to support this species.

Travel Management

The objectives of the transportation management program include maintenance of access for public and administrative needs; establishment of a route system that contributes to protection of sensitive resources; accommodates a variety of uses and minimizes user conflicts; and coordination of OHV management.

Activities occurring under this program may increase human presence (including associated noise disturbances), vegetation disturbance, and minor surface disturbance in yellow-billed cuckoo habitat. Vegetation disturbances, vegetation removal, or vegetation alteration may result in less dense vegetation; an increase in invasive plant species; increased fragmented habitat; reduced availability of nesting habitat; decreased cover from predators; and decreased availability prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. As a result, there may be a decrease in the fitness of adults and

nestlings, and potential western yellow-billed cuckoo habitat may become degraded and unable to support this species.

Vegetation Management

Program objectives are to maintain or improve the diversity of plant communities to support timber production, livestock needs, wildlife habitat, watershed protection, and acceptable visual resources. Therefore, this program includes mechanical, chemical, biological, cultural vegetation management methodologies. These management methodologies may result in ground disturbing activities, chemical impacts, human disturbances, and impacts to vegetation from biological management techniques.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), vegetation treatment or disturbance (mechanical, chemical, biological), and surface disturbance in western yellow-billed cuckoo habitat. Associated noise disturbances may cause avoidance of available habitat. Vegetation alteration, removal, or inadvertent chemical treatment may adversely affect availability and quality of nesting habitat; decrease cover from predators; and decrease insect prey populations. Soil disturbances may increase erosion, adversely affect soil stability, increase sediment deposits, and alter channel morphology. As a result, there may be a decrease in the fitness of adults and nestlings, and potential western yellow-billed cuckoo habitat may become degraded and unable to support this species.

Wildlife and Fisheries Management

This program aims to maintain biological diversity, improve habitat on for wildlife and fisheries, and provide habitats for threatened and endangered species.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), vegetation treatment or disturbance, and surface disturbance in potential western yellow-billed cuckoo habitat. Associated noise disturbances may cause avoidance of habitat. Vegetation disturbances or vegetation removal may adversely affect availability of nesting habitat, cover from predators, and insect prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. As a result, there may be a decrease in the fitness of adults and nestlings, and potential western yellow-billed cuckoo habitat may become degraded and unable to support this species.

Woodland Management

Woodlands management objectives are to maintain and enhance the health, productivity, sustainability, and biological diversity of forest and woodland ecosystems and to provide a balance of natural resource benefits and uses, including opportunities non-commercial harvest of forest and woodland products on a sustainable basis. The BLM manages forests for multiple uses, such as recreation, livestock grazing, wildlife habitat.

Activities occurring under this program may increase human presence, equipment and vehicle use (including associated noise disturbances), vegetation treatment or disturbance, and surface disturbance in yellow-billed cuckoo habitat. Associated noise disturbances may cause avoidance

of potential habitat. Vegetation disturbances, vegetation removal, or chemical treatment of vegetation decrease availability of nesting habitat and decrease prey populations and prey habitat. Soil disturbances may increase erosion, adversely affect soil stability, and increase sediment deposits. Increased occurrence of invasive plants species may change the vegetation community and change the habitat for yellow-billed cuckoo and their prey species. As a result, there may be a decrease in the fitness of adults and nestlings, and potential western yellow-billed cuckoo habitat may become degraded and unable to support this species.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

Cumulative effects to candidate species western yellow-billed cuckoo under the Proposed Actions would include, but are not limited to, the following broad types of impacts:

- Changes in land use patterns or practices that adversely affect a species' critical, suitable, or potential habitat.
- Encroachment of human development into a species' critical, suitable, or potential habitat.
- Fire management actions by some, or all, of the following groups, on lands adjoining or upstream of BLM-administered lands:
 - State of Utah
 - County Governments in Utah
 - Local Governments in Utah
 - Private landholders in Utah

Western yellow-billed cuckoo have been found in the planning area during the spring migration season along the San Juan River. In the potential and suitable western yellow-billed cuckoo habitat, the area is surrounded by a checkerboard pattern of land ownership including Federal, State, and private landowners. Western yellow-billed cuckoo are susceptible to activities on State and private lands. Many of these activities, such as urban growth and development; construction and operation of dams along major waterways; water retention, diversion, or dewatering of springs, wetlands, or streams; recreation; road construction; fuels-reduction treatments; research; grazing activities (including alteration or clearing of native habitats for domestic animals); oil and gas exploration and development; introduction of non-native plant or wildlife species (which can alter native habitats and alter prey populations); and other associated actions. Increases or changes in cowbird foraging areas (construction of corrals, grazing of domestic stock, placement of bird feeders) and habitat fragmentation may increase the parasitism rate and prevent western yellow-billed cuckoo habitat use in the planning area. Increased recreation, camping, off-road vehicle use, and river trips may harass and disturb breeding birds or impact nesting habitats. Contributing as cumulative effects to the proposed action, these activities will continue to affect western yellow-billed cuckoo presence with disturbances to breeding, nesting, and foraging behaviors and habitat (including areas of designated critical habitat), and further fragmenting habitat.

Conclusion

The conclusions of this conference opinion are based on full implementation of the programs as described in the "Description of the Proposed Action" section of this document, including the conservation measures that were incorporated into the project design.

After reviewing the status of western yellow-billed cuckoo, the environmental baseline for the action area, the effects of the proposed project, and the cumulative effects, it is the USFWS's conference opinion that the Monticello BLM Field Office Resource Management Plan, as proposed, is not likely to contribute to listing of western yellow-billed cuckoo. We base our conclusion on the following:

1. The applicant committed resource protection measures will be incorporated into site-specific projects designed under the BLM Resource Management Plan. If project design cannot adhere to all applicant committed resource protection measures, consultation under Section 7 of the Endangered Species Act will be initiated.
2. All site-specific projects designed under the proposed BLM Resource Management Plan would be subject to consultation requirements under Section 7 of the Endangered Species Act.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, as amended, prohibits take (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering (50 CFR § 17.3). "Harass" is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR § 17.3).

Actual take levels are unquantifiable because Monticello Field Office Resource Management Plan implementation includes all possible projects authorized on the entirety lands managed by the Monticello Field Office and may occur within threatened or endangered species' habitats. However, although unquantifiable, take may occur through harm and harassment.

No exemption from Section 9 of the Act is granted in this biological opinion. BLM's continued implementation of Resource Management Plans is likely to adversely affect listed species. The likelihood of incidental take, and the identification of reasonable and prudent measures and terms and conditions to minimize such take, will be addressed in project-level consultations. Levels of incidental take and measures to reduce such take cannot be effectively identified at the level of proposed action because of the broad geographic scope and time frame, and the lack of site specific information. Rather, incidental take and reasonable and prudent measures may be identified adequately through subsequent actions subject to Section 7 consultations at the project-specific scale.

REASONABLE AND PRUDENT MEASURES / TERMS AND CONDITIONS

BLM coordinated and developed, with the USFWS, species-specific conservation measures. These conservation measures were included as part of the Resource Management Plan project description. Therefore, the USFWS believes that Reasonable and Prudent Measures and Terms and Conditions will not be necessary in this programmatic opinion due to the BLM's proactive initiation to minimize impacts on listed species. We commend BLM's efforts to conserve and protect threatened and endangered species. It is possible that additional reasonable and prudent measures and terms and conditions may be required on a project-specific level, in a tiered consultation to this programmatic opinion.

RECOMMENDED CONSERVATION MEASURES

The USFWS recommends incorporating the following guidance into the Resource Management Plan to ensure successful management, protection, and recovery of listed species and their habitats at the landscape and site-specific levels. The USFWS understands that Recommended Measures are not always feasible or applicable for all projects. Available Recovery Plans, Conservation Agreements/Strategies, Scientific Literature, and other available information should consistently be applied to occupied, suitable, and potentially suitable habitats of listed species. The following recommendations should be used in conjunction with available species-specific plans and literature and appropriately applied at the landscape and site-specific planning levels in a manner that ensures conservation and recovery of listed and sensitive species. In general, these guidelines should apply to listed and sensitive species habitats in areas of known and likely occurrence, particularly where recovery and conservation objectives have been identified by available species-specific plans.

All Species

- Avoid land trades/disposals of listed and sensitive species habitats.
- Avoid the broad-scale use of pesticides and insecticides in habitats of listed species, during sensitive time periods such as breeding and nesting seasons.
- Avoid use of pesticides in riparian habitats and areas adjacent to riparian areas. If used, avoid drift and apply non-persistent pesticides with low bioaccumulation potential.
- Encourage management that maintains sagebrush ecological sites.
- Avoid practices that permanently convert sagebrush shrubland to nonnative grassland.
- Implement management strategies that maintain or improve degraded riparian communities; protect natural flow requirements; protect water quality; manage for stable non-eroding banks; and manage for year-round flows.
- Manage riparian areas from a watershed perspective. Ensure that riparian areas within the project are as continuous as possible along the entire drainage and are as wide as the soil and water table will allow riparian vegetation to exist.
- Manage riparian areas to ensure a multi-aged, multi-layered structure, allowing for retention of snags and diseased trees. Provide multiple layers of vegetation (vertical structure) within 10 feet of the ground.

- Enhance the protection of wetland functions by emphasizing the protection of natural wetland structure, composition, and ecological processes.
- Establish appropriate buffers between wetlands and incompatible land uses adequate to preserve the functional integrity of the wetlands.
- Discourage development of natural water sources under BLM's management.
- When considering spring development/redevelopment, evaluate springs for occurrence of flora and fauna, with particular focus on detecting rare or unique species. Maintain sufficient water to sustain native flora and fauna. Return unused or overflow water to its original drainage. Protect the spring source area from detrimental impacts, e.g. from livestock, recreationists. Protect the spring source from risk of degradation of water quality.
- Fully mitigate all unavoidable habitat losses for listed and migratory birds, at a suggested ratio of 1:1. Mitigate all unavoidable riparian losses at a suggested ratio of 2:1. This ratio may be increased if mitigation does not occur prior to disturbance, if replacement habitat is less valuable than lost habitat, if habitat fragmentation is causing broad-scale impacts to remaining available habitats, or other reasons. Both direct and indirect habitat losses will be considered and fully mitigated.
- Increase 1:1 ratio of sagebrush steppe habitat mitigation if mitigation will occur off-site, be completed after the impact, or is otherwise unequal to the loss of habitat.
- Include native forbs and grasses in seeding mixtures where feasible.
- Monitor condition of habitat in occupied, suitable, or potentially suitable habitat for listed and sensitive species to ensure maintenance of good to excellent ecological conditions; restoration and conservation of good to excellent aquatic habitat conditions; and consistent with available species-specific habitat requirements.
- Consider wildlife use when designing spring exclosures.
- If water developments occur, divert water several hundred feet downstream of the water source to allow wildlife to benefit, hydric species to perpetuate, and water quality to remain high.
- Limit the amount of time livestock spend in pastures with riparian areas; base grazing seasons/length on condition of riparian vegetation.
- Maintain or modify existing grazing regimes to promote growth of desirable vegetation and maintain desirable understory vegetation. Temporarily remove grazing from degraded habitats and habitats recovering from fire and other disturbances.
- Manage grazing to maintain riparian habitats with all desirable vegetation structure and age classes.
- Avoid construction or expansion of recreation facilities within occupied, suitable, and potentially suitable habitat for listed and sensitive species.
- Limit the number of new roadways in project areas when possible to protect wildlife and plant resources. Decommission unnecessary roads and reclaim unauthorized illegal trails in habitats important to listed and sensitive species.
- Where appropriate at designated recreation sites, design recreation activities that are predictable for wildlife; i.e. provide well-marked trails or boardwalks to encourage controlled and predictable human use away from listed and sensitive species habitats, and discourage off-trail hiking and creation of alternate routes.
- Avoid constructing new trails along or parallel to riparian areas.

- Reduce or restrict recreational uses including, but not limited to, all-terrain vehicles, bicycles, horses, birdwatchers, and hikers in riparian areas.
- Where recreation conflicts with use by listed and sensitive species, and area closures are not practical, provide on-site monitoring to educate users and control use.
- Sponsor programs and post signs that educate users about the value of riparian habitat to listed and sensitive species.
- Provide interpretive site and literature on recognition and value of protecting biological soil crusts at major access points in areas of extensive or unique crust formation.
- Avoid building new roads and trails in riparian areas, and avoid stream crossings.
- Close affected watersheds and/or riparian areas to livestock grazing for one or more years to allow for recovery of riparian vegetation. The appropriate length of time for closure to grazing will depend on site-specific characteristics.
- Avoid or restrict mineral development activities in riparian habitats.
- Disturbances of all suitable habitats for listed and sensitive species will be improved to provide adequate habitat (pre-disturbance condition or better).

Yellow-billed cuckoo

- Avoid destruction of existing native cottonwood-willow dominated riparian forests and restore riparian habitats where possible.
- Eliminate loss of dense shrub layers in existing riparian areas and restore shrub areas where absent, when ecologically appropriate.
- Closely monitor grazing, recreational, and other impacts on cottonwood and willow seedlings in riparian systems and reduce or remove sources when seedlings are being impacted.
- Avoid habitat altering activities in riparian areas.

Mexican spotted owl

- Consider seasonal (March 1 – August 31) and spatial (0.5 mile) closures for recreational activities within PAC areas and suitable owl habitats.
- Maintenance of existing facilities within occupied (including PACs) and suitable Mexican spotted owl habitats should be avoided during the breeding season (March 1 – August 31).
- Implement recreational restrictions that protect occupied (including PACs) and suitable Mexican spotted owl habitats. Include these restrictions as part of all special recreation permits. Examples include, but are not limited to group size limits, length of stay, allowed use areas.
- Avoid road or trail building within PACs.
- Assess the presence and intensity of recreational activities in PACs, and apply appropriate measures to minimize impacts to the Mexican spotted owl and its habitat, in accordance with Recovery Plan recommendation and best available scientific information.
- Limit OHV and Guided Vehicle Tour uses to designated road and trails in Mexican spotted owl habitat and PACs.

- Conduct pre- and post-monitoring of Mexican spotted owl habitat conditions in PAC areas for surface disturbing activities.

Southwestern willow flycatcher

- Provide that areas of stop over and -potentially suitable habitat the southwestern willow flycatcher are protected from impacts associated with recreational use; i.e. confine camping areas, restore impacted habitats, minimize attractants to scavengers, predators, and brown-headed cowbirds as appropriate.
- Minimize noise disturbance near suitable and potentially suitable southwestern willow flycatcher habitat. Measures may include, but are not limited to, rerouting trails and day use areas away from habitats, controlling the number of visitors, and discouraging use of loud equipment near breeding locations.
- Restore or maintain perennial surface flows and shallow groundwater in suitable southwestern willow flycatcher habitats, and areas targeted for restoration of suitable habitat.
- Avoid habitat altering activities in riparian areas.
- Unavoidable disturbances of riparian habitats suitable for southwestern willow flycatchers will be restored (pre-disturbance conditions or better) to provided adequate habitat for the species.

Colorado Fish Species

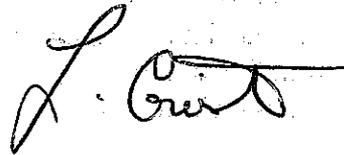
- Implement INFISH standards or other appropriate methodologies based on soil and terrain conditions, to provide riparian functions, including delivery of organic matter and woody debris, stream shading, and bank stability.
- In accordance with INFISH, no disturbance should occur within a buffer zone of 300' on each side of perennial fish bearing streams, 150' on each side of perennial non-fish bearing streams, and between 50' - 100' on each side of intermittent streams.
- Encourage activities to eliminate competing nonnative species and discourage any introduction of nonnative species into aquatic systems.
- Allow for translocations, fish control and removal, transfers, and other movement of fish for conservation and recovery of the species.
- Implement management strategies to restore fish passage, restore and retain natural hydrograph and hydrology, restore and ensure an appropriate distribution of aquatic habitats with special attention to native aquatic species, and restore and protect natural stream processes and function.
- In watersheds that are adjacent to the Colorado and San Juan Rivers (and their important tributaries), and within major seleniferous formations (e.g., Mancos Shale and Duchesne), manage biological soil crusts to reduce erosion of selenium-bearing soils to habitat for endangered Colorado River fish.
- Provide resource protection measures associated with fishing access, i.e. provide well-marked trails or boardwalks to encourage controlled and predictable human use and discourage off-trail hiking and creation of alternate routes particularly in riparian areas.

- Implement INFISH standards (i.e., riparian buffers), or other appropriate methodologies based on soil and terrain conditions, to provide riparian functions, including delivery of organic matter and woody debris, stream shading, and bank stability.
- Avoid construction of fire lines using mechanized equipment so that they cross stream channels or terminate at the stream channel.
- Avoid mixing or applying fire suppressant chemicals (i.e. surfactant foam or retardant formulations) within 300 feet of the stream channel, except when a threat to human life or property exists.
- Avoid transferring water from one watershed into another for the purpose of water drops, as this may aid in spread of water-borne diseases such as whirling disease.
- Manage fire regimens (prescribe and wild) to protect or improve riparian and flood plain habitats.
- Pipeline crossings of perennial, intermittent, and ephemeral stream channels should be constructed to withstand floods of extreme magnitude to prevent breakage and subsequent accidental contamination of runoff during high flow events.
- Surface crossings must be constructed high enough to remain above the highest possible stream flows at each crossing, and subsurface crossings must be buried deep enough to remain undisturbed by scour throughout passage of the peak flow.
- To avoid repeated maintenance of pipeline crossings, hydraulic analysis should be completed in the design phase to eliminate costly repair and potential environmental degradation associated with pipeline breaks at stream crossings.

RE-INITIATION STATEMENT

This is a program-level document that does not include project specific detail for actions authorized by the existing RMPs. Additional consultation with USFWS will be necessary for any authorized project specific action that may impact any listed species. This concludes formal consultation on the on the continued implementation of Monticello Resource Management Plan. As provided in 50 CFR §402.16, re-initiation of formal consultation is required if: 1) new information reveals effects of the agency action that may impact listed species or critical habitat in a manner or to an extent not considered in this opinion, 2) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion, 3) a new species is listed or critical habitat designated that may be affected by the action, or 4) water depletions are expected to occur.

Thank you for your interest in conserving threatened and endangered species. If we can be of further assistance, please contact Katherine Richardson at (801) 975-3330 ext. 125 or Laura Romin at ext. 123.

A handwritten signature in black ink, appearing to read "J. Curt". The signature is written in a cursive style with a long horizontal stroke extending to the right.

LITERATURE CITED

Mexican spotted owl

- American Ornithologists' Union. 1957. Checklist of North American birds. Fifth ed. Am. Ornithologists' Union, Washington, D.C. 691pp.
- Delaney, D. K., T. G. Grubb, and L. L. Pater. 1997. Effects of helicopter noise on nesting Mexican spotted owls. A report to the U.S. Air Force 49 CES/CEV, Holloman Air Force Base. Project Order No. CE P. O. 95-4. 49 pp.
- Earhart, C. M., and N. K. Johnson. 1970. Size dimorphism and food habits of North American owls. *Condor* 72:251-264.
- Fletcher, K. W. and H. E. Hollis. 1994. Habitats used, abundance, and distribution of the Mexican spotted owl (*Strix occidentalis lucida*) on National Forest System lands in the southwestern region. USDA Forest Service, Southwestern Region, Albuquerque, New Mexico.
- Forsman, E. D., E. C. Meslow, and M. J. Strub. 1976. Spotted owl abundance in second-growth versus old-growth forest. *Bulletin of the Wildlife Society of Washington*. 5(2): 43-47.
- Forsman, E. D. 1981. Molt of the Spotted Owl. *Auk* 98:735-742.
- Forsman, E. D., E. C. Meslow, and H. M. Wight. 1984. Distribution and biology of the spotted owl in Oregon. *Wildlife Monographs* No. 87. 64 pp.
- Ganey, J. L. 1988. Distribution and habitat ecology of the Mexican spotted owls in Arizona. M.S. Thesis Northern Arizona University, Flagstaff, Arizona. 229 pp.
- Ganey, J. L., and R. P. Balda. 1989. Distribution and habitat use of Mexican spotted owls in Arizona. *Condor* 91:355-361.
- Ganey, J. L., and R. P. Balda. 1994. Habitat selection by Mexican spotted owls in northern Arizona. *Auk* 111:162-169.
- Ganey, J. L. and W. M. Block. 2005. Winter movements and range use of radio-marked Mexican spotted owls: an evaluation of current management recommendations. Gen. Tech. Rep. RMRS-GTR-148-WWW. Fort Collins, Colorado: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 9 p.
- Ganey, J. L., G. C. White, A. B. Franklin, J. P. Ward, Jr., and D. C. Bowden. 2000. A pilot study on monitoring populations of Mexican spotted owls in Arizona and New Mexico: second interim report. 41 pp.
- Gutierrez, R. J. and S. E. Rinkevich. 1991. Final Report Distribution and Abundance of Spotted Owls in Zion National Park, 1991, National Park System Order No. PX-1200-9-C820.

- Gutierrez, R. J., C. A. May, M. L. Peterson, M. E. Seamans. 2003. Temporal and spatial variation in the demographic rates of two Mexican spotted owl populations. Final Report, submitted to USDA, Rocky Mountain Research Station, Fort Collins, Colorado. 146 pp.
- Hammitt, W. E. and D. N. Cole. 1987. Wildland recreation: ecology and management. John Wiley and Sons, New York. 341 pp.
- Johnsgard, P. A. 1988. North American owls: Biology and natural history. Smithsonian Institution Press, Washington D.C.
- Moen, C. A., A. B. Franklin, and R. J. Gutierrez. 1991. Age determination of subadult northern spotted owls in northwest California. *Wildlife Society Bulletin*. 19:489-493.
- Rinkevich, S. E. 1991. Distribution and habitat characteristics of Mexican spotted owls in Zion National Park, Utah. M.S. Thesis. Humboldt State University, Arcata, California. 62pp.
- Seamans M. E., R. J. Gutiérrez, C. A. May, M.Z. Peery. 1999. Demography of two Mexican spotted owl populations. *Conservation Biology*. 13:744-754.
- Skaggs, R. W., and R. J. Raitt. 1988. A Spotted Owl inventory on the Lincoln National Forest Sacramento Division: 1988. Contract No. 5-5 16.6-76-17. New Mexico Department of Game and Fish. Santa Fe, New Mexico.
- Thomas, J. W., M. G. Raphael, R.G. Anthony, E. D. Forsman, A. G. Gunderson, R.S. Holthausen, B. G. Marcot, G. H. Reeves, J. R. Sedell, and D. M. Solis. 1993. Viability assessments and management considerations for species associated with late-successional and old-growth forests of the Pacific Northwest. USDA Forest Service, Portland, Oregon. 529 pp.
- U.S. Fish and Wildlife Service (USFWS). 1993. Endangered and Threatened Wildlife and Plants; final rule to list the Mexican spotted owl as threatened. *Federal Register* 58(49):14248-14271. March 16, 1993.
- U.S. Fish and Wildlife Service (USFWS). 1995. Recovery Plan for the Mexican Spotted Owl. Albuquerque, New Mexico.
- U.S. Fish and Wildlife Service (USFWS). 2004. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Mexican Spotted Owl. *Federal Register* 69 (168): 53181-53298; August 31, 2004.
- Utah Division of Wildlife Resources (UDWR). 2003. <http://dwr.cdc.nr.utah.gov/ucdc/>
- Verner, J., K. S. McKelvey, B. R. Noon, R. J. Gutierrez, G. I. Gould, Jr., and T. W. Beck, eds. 1992. The California spotted owl: a technical assessment of its current status. USDA Forest Service General Technical Report PSW-133. 285 pp.
- Walker, L. W. 1974. The book of owls. Alfred A. Knopf, New York, N.Y 255 pp.

- White G. C., A. B. Franklin, J. P. Ward Jr. 1995. Population biology. *In*: United States Department of Interior, Fish and Wildlife Service. Recovery Plan for the Mexican spotted owl (*Strix occidentalis lucida*), volume II. Technical supporting information. Chapter 2:1–25. United States Fish and Wildlife Service, Albuquerque, New Mexico. (Available at <http://mso.fws.gov/recovery-plan.htm>).
- Willey, D. W. 1993. Home-range characteristics and juvenile dispersal ecology of Mexican spotted owls in southern Utah. Unpublished Report. Utah Division Wildlife Resources, Salt Lake City, Utah.
- Willey, D. W. 1995. Mexican spotted owls in canyonlands of the Colorado Plateau. *Pp.* 330-331 *In*: LaRoe, E. T., Farris, G. S., Puckett, C. E., Doran, P. D. and Mac, M. J., editors. *Our living resources: A report to the nation on the distribution, abundance, and health of U.S. plants, animals, and ecosystems*. U.S. Department of the Interior, National Biological Service, Washington, D.C.
- Willey, D. W. 1998. Movements and habitat utilization by Mexican spotted owls within the canyon lands of Utah. PhD Thesis. Northern Arizona University. 87pp.
- Willey, D. W. and D. Spotskey. 1997. Unpublished GIS model for Mexican spotted owl breeding habitat. Final Report; Arizona Heritage Program, Phoenix, Arizona.
- Willey, D. W. and D. Spotskey. 2000. Field test of a habitat model for Mexican spotted owl breeding habitat. Final Report; Arizona Heritage Program, Phoenix, Arizona.

Southwestern willow flycatcher

- Anderson, B. W., A. Higgins, and R. D. Ohmart. 1977. Avian use of saltcedar communities in the lower Colorado River Valley. *In*: Johnson RR, Jones DA (tech. coord.), Proc. Symp. The importance, preservation and management of riparian habitat, July 9, 1977, Tucson, Arizona. USDA Forest Service Rocky Mountain Forest Range Experiment Station, Fort Collins, Colorado. General Technical Report RM-43, pp. 128-136.
- Behle, W. H., Bushman, and C. M. Greenhalgh. 1958. Birds of the Monticello area and adjacent high plateaus of southern Utah. University of Utah Biological Service. 11:1-92.
- Behle, W. H. and H. G. Higgins. 1959. The birds of Glen Canyon. *In*: Ecological Studies of Flora and Fauna in Glen Canyon (A.M. Woodbury, ed.) University Utah Anthropol. Pap. 40 (Glen Canyon Series No. 7), pp 107-133.
- Behle, W. H. 1985. Utah Birds: Geographic Distribution and Systematics: Occasional Publication, no. 5. Utah Museum of Natural History, University of Utah, Salt Lake City.
- Browning, M. R. 1993. Comments on the taxonomy of *Empidonax trailli* (willow flycatcher). *Western Birds* 24:241-257.
- Christensen, E. M. 1962. The rate of naturalization of *Tamarix* in Utah. *American Midland Naturalist* 68:51-57.

- Finch, M. F., J. F. Kelly, and J. E. Cartron. 2000. Migration and Winter Ecology. Chapter 7 *In* D. Finch and S. Stoleson, eds. Status, Ecology and Conservation of the Southwestern Willow Flycatcher. USDA Forest Service General Technical Report RMRS-GTR-60.
- DeLoach, C. J. 1991. Saltcedar, an exotic weed of western North American riparian areas: A review of its taxonomy, biology, harmful and beneficial values, and its potential for biological control. Report to the Bureau of Reclamation, Boulder City, Nevada.
- Durst, S. L., M. K. Sogge, H. C. English, S. O. Williams III, B. E. Kus, S. J. Sferra. 2004. Southwestern willow flycatcher breeding site and territory summary – 2004. U. S. Geological Survey, Southwest Biological Science Center, Colorado Plateau Research Station. Flagstaff, Arizona. 18 pp.
- Graf, W. L. 1982. Tamarisk and river-channel management. *Environmental Management* 6:283-296.
- Horton, J. S. 1977. The development and perpetuation of the permanent tamarisk type in the phreatophyte zone of the southwest. Contributed paper, Symposium on the Importance, Preservation and Management of the Riparian Habitat, July 9, 1977, Tucson, Arizona. pp 124-127.
- Howell, S. N. G. and S. Webb. 1995. *A Guide to the Birds of Mexico and Northern Central America*. Oxford University Press. 851 pp.
- Hubbard, J. P. 1987. The status of the Willow flycatcher in New Mexico. Endangered Species Program, New Mexico Dept. Of Game and Fish, Santa Fe, New Mexico. 29 pp.
- Johnson, M. J. and C. O'Brien. 1998. Southwestern willow flycatcher and yellow-billed cuckoo surveys along the San Juan River, Utah (Four Corners Bridge - Mexican Hat): 1998. Final Report to the Utah Division of Wildlife Resources (Contract # 976475). Colorado Plateau Field Station/Northern Arizona University report. 45 pp.
- Johnson, M. J. 1998. Southwestern willow flycatcher surveys in the Manti-La Sal National Forest, (Monticello and Monticello Districts) Utah: 1998. Final report to the Utah Division of Wildlife Resources. USGS Biological Resources Division, Forest and Rangeland Ecosystem Science Center, Colorado Plateau Field Station, Northern Arizona University report, Flagstaff, Arizona. 19 pp.
- Johnson, M. J., A. Brand, H. C. English, C. Michaud, and B. Moore. 1999a. Southwestern Willow Flycatcher and Western Yellow-billed Cuckoo Surveys along the Colorado River (Dewey Bridge - Canyonlands National Park Northern Boundary) and Green River, UT - Canyonlands National Park Northern Boundary) 1999. U.S. Geological Survey report to the U.S. Bureau of Reclamation and the Utah Department of Natural Resources.
- Johnson, M. J., A. Brand, H. C. English, C. Michaud, and B. Moore. 1999b. Southwestern Willow Flycatcher and Western Yellow-billed Cuckoo Surveys in the Canyonlands National Park along the Colorado and Green Rivers, 1999. U.S. Geological Survey report to the U.S. Bureau of Reclamation and the Utah Department of Wildlife Resources.

- Langridge, S. M. and M. K. Sogge. 1998. Banding and genetic sampling of willow flycatcher in Utah: 1997 and 1998. U.S.G.S. Colorado Plateau Field Station/Northern Arizona University report. 60 pp.
- Johnson, Matthew. 2004. Willow Flycatcher, Yellow-billed Cuckoo, Mexican Spotted Owl and Black Swift Surveys on Lands Administered by BLM Monticello Field Office.
- McCarthy, T.D., C.E. Paradzick, J.W. Rourke, M.W. Sumner, and R.F. Davidson. 1998. Arizona Partners In Flight southwestern willow flycatcher 1997 survey and nest monitoring report. Nongame and Endangered Wildlife Program Technical Report 130. Arizona Game and Fish Department, Phoenix, Arizona.
- Owen, J. C. and M. K. Sogge. 2002. Physiological condition of southwestern willow flycatchers in native and saltcedar habitats. U.S. Geological Survey report to the Arizona Department of Transportation, Phoenix, Arizona.
- Paxton, E. H. 2000. Molecular Genetic Structuring and Demographic History of the Willow Flycatcher (*Empidonax trailli*). A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Biology. Northern Arizona University, May 2000.
- Paxton, E., J. J. Owen, and M.K. Sogge. 1996. Southwestern willow flycatcher response to catastrophic habitat loss. Colorado Plateau Research Station. U. S. Geological Survey Biological Resources Division. Northern Arizona University, Flagstaff, Arizona. 12 pp.
- Phillips, A. R. 1948. Geographic variation in *Empidonax trailli*. *Auk* 65:507-514.
- Phillips, A. R., J. Marshall, and G. Monson. 1964. The Birds of Arizona. University of Arizona Press, Tucson, Arizona. 212 pp.
- Ridgely, R. S. and G. Tudor. 1994. The Birds of South America. Volume II: The Suboscine Passerines. University of Texas Press, Austin, Texas. 814 pp.
- Schreier, W. 1996. Bryce Canyon National Park 1996 Federal Endangered Avian Species Survey Report: Southwestern Willow Flycatcher. Colorado Plateau System Support Office, Intermountain Field Area, National Park Service: Bryce Canyon, Utah.
- Sedgwick, J. A. 1998. Regional Variability in the Song of the Southwestern Willow Flycatcher. Draft report to the Arizona Game and Fish Department. USGS Biological Resources Division, Midcontinent Research Station, Fort Collins, CO. 15 pp. plus appendices.
- Sedgwick, J. A. 2001. Geographic variation in the song of willow flycatchers: differentiation between *Empidonax trailli adastus* and *E. t. extimus*. *Auk* 118(2):366-379, 2001.
- Sferra, S.J., T.E. Corman, C.E. Paradzick, J.W. Rourke, J.A. Spencer, and M.W. Sumner. 1997. Arizona Partners In Flight southwestern willow flycatcher survey: 1993-1996 summary report. Nongame and Endangered Wildlife Program Technical Report 113. Arizona Game and Fish Department, Phoenix, Arizona.

- Sogge, M. K. 2000. Breeding Season Ecology. Chapter 6 *In* D. Finch and S. Stoleson, eds. Status, Ecology and Conservation of the Southwestern Willow Flycatcher. USDA Forest Service General Technical Report RMRS-GTR-60.
- Sogge, M. K., R. M. Marshall, S. J. Sferra, and T. J. Tibbitts. 1997. A Southwestern Willow Flycatcher Natural History Summary and Survey Protocol. Technical Report NPS/NAUCPRS/NRTR-97/12.
- Sogge, M. K. and R. M. Marshall. 2000. A survey of current breeding habitats. Chapter 9 *In* D. Finch and S. Stoleson, eds. Status, Ecology and Conservation of the Southwestern Willow Flycatcher. USDA Forest Service General Technical Report RMRS-GTR-60.
- Sogge, M. K., S. J. Sferra, T. D. McCarthy, S. O. Williams, and B. E. Kus. 2003. Distribution and characteristics of Southwestern Willow Flycatcher Breeding Sites and Territories. *Studies in Avian Biology* 26:5-11.
- Sogge, M. K. and T. J. Tibbitts. 1994. Distribution and Status of the Southwestern Willow Flycatcher along the Colorado River in the Grand Canyon - 1994. Summary Report. National Biological Service Colorado Plateau Research Station/Northern Arizona University and U.S. Fish and Wildlife Service. 37 pp.
- Stiles, F. G. and A. F. Skutch. 1989. A Guide to the Birds of Costa Rica. Cornell University Press, New York.
- Travis, J. R. 1996. Song Types of Willow Flycatchers in New Mexico. Contract No. 95-516-67. Endangered Species Program, New Mexico Department of Game and Fish, Santa Fe, New Mexico. 31 pp.
- Unitt, P. 1987. *Empidonax traillii extimus*: An endangered subspecies. *Western Birds* 18:137-162.
- Unitt, P. 1997. Winter range of *Empidonax traillii extimus* as documented by existing museum collections. Report to the U.S. Bureau of Reclamation, Phoenix, Arizona.
- Utah Division of Wildlife Resources. 2007. Draft Population Monitoring of Neotropical Migratory Birds in Riparian Habitat of Utah. 1992 - 2005 Summary Report. UDWR Publication Number 07-17.
- U.S. Fish and Wildlife Service (USFWS). 1995. Final rule determining endangered status for the southwestern willow flycatcher (*Empidonax traillii extimus*). February 27, 1995. Federal Register 60:10694.
- U.S. Fish and Wildlife Service (USFWS). 1997. Final determination of critical habitat for the southwestern willow flycatcher. July 22, 1997. Federal Register 62(140):39129-39146.
- U.S. Fish and Wildlife Service (USFWS). 2001. Southwestern Willow Flycatcher Recovery Plan. Albuquerque, New Mexico. Prepared by Southwestern Willow Flycatcher Recovery Team Technical Subgroup.

- U.S. Fish and Wildlife Service (USFWS). 2002. Final Recovery Plan Southwestern Willow Flycatcher. Albuquerque, New Mexico. Prepared by Southwestern Willow Flycatcher Recovery Team Technical Subgroup.
- U.S. Fish and Wildlife Service (USFWS). 2003. Final Recovery Plan Southwestern Willow Flycatcher. Albuquerque, New Mexico. Prepared by Southwestern Willow Flycatcher Recovery Team Technical Subgroup.
- U.S. Fish and Wildlife Service (USFWS). 2005. Designation of Critical Habitat for Southwestern willow flycatcher, Final Rule. October 19, 2005. Federal Register 70(201):60886-61009.
- Wauer, R. H. and D. L. Carter. 1965. Birds of Zion National Park and vicinity. Zion Natural History Association, Springdale, Utah. 92 pp.
- Whitfield, M.J. 1990. Willow flycatcher reproductive response to brown-headed cowbird parasitism. Masters Thesis, California State University, Chico, California. 25 pp.
- Whitfield, M. J. and C. M. Strong. 1995. A Brown-headed cowbird control program and monitoring for the Southwestern Willow Flycatcher, South Fork Kern River, California, 1995. California Department of Fish and Game, Sacramento. Bird and Mammal Conservation Program Report 95-4.
- Whitfield, M. J. and K. M. Enos. 1996. A Brown-headed cowbird control program and monitoring for the Southwestern Willow Flycatcher, South Fork Kern River, California, 1996. California Department of Fish and Game, Sacramento, California. Final report for contract #FG4100WM-1.
- Yong, W. and D. M. Finch. 1997. Migration of the Willow Flycatcher along the Middle Rio Grande. Wilson Bulletin 109:253-268.

Navajo Sedge

- Bureau of Land Management (BLM). 2001. Special Status Species Management – Manual 6840. Rel. 6-121.
- NatureServe. 2008. *Carex specuicola*. NatureServe and other Statuses, Conservation Status Factors, Threats, and Range. 5 pages.
- U.S. Fish and Wildlife Service (USFWS). 1985. Final rule determining threatened status for the Navajo sedge (*Carex specuicola*). May 8, 1985. Federal Register 50:19370.
- U.S. Fish and Wildlife Service (USFWS). 1987. Navajo Sedge Recovery Plan. Albuquerque, New Mexico. Prepared by Donna E. House, Navajo Natural Heritage Program.

COLORADO FISHES

Bonytail

- Cope, E. D., and H. C. Yarrow. 1875. Reports upon the collections of fishes made in portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona during the years 1871, 1872, 1873, and 1874. Report of Geographical and Geological Explorations West of the 100th Meridian (Wheeler Survey) 5:635–703.
- Gilbert, C. H., and N.B. Scofield. 1898. Notes on a collection of fishes from the Colorado Basin in Arizona. Proceedings of the U.S. National Museum 20:487–499.
- Holden, P. B., and C. B. Stalnaker. 1970. Systematic studies of the genus *Gila* (Cyprinidae) of the Colorado River. Copeia 1970:409–420.
- Holden, P. B., and C. B. Stalnaker. 1975. Distribution of fishes in the Dolores and Yampa river systems of the upper Colorado basin. Southwestern Naturalist 19:403–412.
- Jordan, D. S. 1891. Report of explorations in Colorado and Utah during the summer of 1889, with an account of the fishes found in each of the river basins examined. U.S. Fish Commission, Bulletin 9:1–40.
- Jordan, D.S., and B.W. Evermann. 1896. The fishes of North and Middle America. Bulletin of the U.S. National Museum 47:1–1240.
- Kaeding, L. R., B. D. Burdick, P. A. Schrader, and W. R. Noonan. 1986. Recent capture of a bonytail (*Gila elegans*) and observations of this nearly extinct cyprinid from the Colorado River. Copeia 4:1021–1023.
- Kirsch, P. H. 1889. Notes on a collection of fishes obtained in the Gila River at Fort Thomas, Arizona, Lt. W.L. Carpenter, U.S. Army. Proceedings of the U.S. National Museum 11:555–558.
- Miller, R. R. 1961. Man and the changing fish fauna of the American Southwest. Michigan Academy of Science, Arts, and Letters Paper 46:365–404.
- Miller, W. H., L. R. Kaeding, H. M. Tyus, C. W. McAda, and B. D. Burdick. 1984. Windy Gap Fishes Study. U.S. Department of the Interior, Fish and Wildlife Service, Salt Lake City, Utah. 37 pp.
- Minckley, W. L. 1973. Fishes of Arizona. Arizona Game and Fish Department, Sims Printing Company, Inc., Phoenix, Arizona.
- Nesler, T. P., K. Christopherson, J. M. Hudson, C. W. McAda, F. Pfeifer, and T. E. Czapla. 2003. An integrated stocking plan for razorback sucker, bonytail, and Colorado pikeminnow for the Upper Colorado River Endangered Fish Recovery Program. Addendum to State Stocking Plans.
- Ono, R. D., J. D. Williams, and A. Wagner. 1983. Vanishing fishes of North America. Stone Wall Press, Washington, D.C.

- U.S. Fish and Wildlife Service (USFWS). 1994. Determination of critical habitat for four endangered Colorado River fishes. Federal Register 59(54):13374-13400.
- U.S. Fish and Wildlife Service (USFWS). 2002a. Bonytail (*Gila elegans*) Recovery Goals: amendment and supplement to the Bonytail Chub Recovery Plan. U.S. Fish and Wildlife Service, Mountain- Prairie Region (6), Denver, Colorado.
- Valdez, R. A. 1990. The endangered fish of Cataract Canyon. Final Report of Bio/West, Inc., Logan, Utah, to U.S. Bureau of Reclamation, Salt Lake City, Utah.
- Valdez, R. A., P. G. Mangan, R. Smith, and B. Nilson. 1982. Upper Colorado River investigations (Rifle, Colorado, to Lake Powell, Utah). Pages 100–279 in U.S. Fish and Wildlife Service. Colorado River Fishery Project, Final Report, Part 2: Field Investigations. U.S. Fish and Wildlife Service, Salt Lake City, Utah.
- Valdez, R. A. M. Moretti, and R. J. Ryel. 1994. Records of bonytail captures in the upper Colorado River Basin. Unpublished report. Utah Division of Wildlife Resources, Salt Lake City, Utah.
- Vanicek, C. D. 1967. Ecological studies of native Green River fishes below Flaming Gorge Dam, 1964–1966. Doctoral Dissertation. Utah State University, Logan, Utah.
- Vanicek, C. D., and R. Kramer. 1969. Life history of the Colorado squawfish, *Ptychocheilus lucius*, and the Colorado chub, *Gila robusta*, in the Green River in Dinosaur National Monument, 1964–1966. Transactions of the American Fisheries Society 98:193–208.
- Wick, E. J., D. E. Snyder, D. Langlois, and T. Lytle. 1979. Colorado squawfish and humpback chub population and habitat monitoring. Federal Aid to Endangered Wildlife Job Progress Report. SE-3-2. Colorado Division of Wildlife, Denver, Colorado. 56 pp. + appendices.
- Wick, E. J., T. A. Lytle, and C. M. Haynes. 1981. Colorado squawfish and humpback chub population and habitat monitoring, 1979–1980. Endangered Wildlife Investigations, Colorado Division of Wildlife, Denver, Colorado.

Colorado pikeminnow

- Bureau Behnke, R. J. 1980. The impacts of habitat alterations on the endangered and threatened fishes of the Upper Colorado River Basin: A discussion in Energy Development in the Southwest: Problems of water, fish, and wildlife in the Upper Colorado River Basin. vol. 2, ed. W. O. Spofford, Jr., A.L. Parker, and A.V. Kneese, pp. 182-192. Research Paper R-18. Washington, D.C.: Resources for the Future.
- Behnke, R. J., and D. E. Benson. 1983. Endangered and threatened fishes of the Upper Colorado River Basin. Colorado State University Cooperative Extension Service Bulletin 503A.
- Bell, A., D. Berk, and P. Wright. 1998. Green River flooded bottomlands mapping for two water flows in May 1996 and one water flow in June 1997. Technical Memorandum No. 8260-98-07. U.S. Bureau of Reclamation, Technical Service Center, Denver, Colorado.

- Bestgen, K. R., D. W. Beyers, G. B. Haines, and J. A. Rice. 1997. Recruitment models for Colorado squawfish: tools for evaluating relative importance of natural and managed processes. Final Report of Colorado State University Larval Fish Laboratory to U.S. National Park Service Cooperative Parks Study Unit and U.S. Geological Survey Midcontinent Ecological Science Center, Fort Collins, Colorado.
- Bestgen, K. R., R. T. Muth, and M. A. Trammell. 1998. Downstream transport of Colorado squawfish larvae in the Green River drainage: temporal and spatial variation in abundance and relationships with juvenile recruitment. Final Report of Colorado State University Larval Fish Laboratory to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Carlson, C. A., and R. T. Muth. 1989. The Colorado River lifeline of the American Southwest. Canadian Special Publication of Fisheries and Aquatic Sciences 106:220-239.
- Day, K. S., and C. Crosby. 1997. An assessment of young-of-the-year Colorado squawfish (*Ptychocheilus lucius*) use of backwater habitats in the Green River, Utah. Utah Division of Wildlife Resources, Vernal, Utah.
- Day, K. S., K. D. Christopherson, and C. Crosby. 1999a. An assessment of young-of-the-year Colorado pikeminnow (*Ptychocheilus lucius*) use of backwater habitats in the Green River, Utah. Report B in Flaming Gorge Studies: assessment of Colorado pikeminnow nursery habitat in the Green River. Final Report of Utah Division of Wildlife Resources to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Day, K. S., K. D. Christopherson, and C. Crosby. 1999b. Backwater use by young-of-year chub (*Gila* spp.) and Colorado pikeminnow in Desolation and Gray canyons of the Green River, Utah. Report B in Flaming Gorge Studies: reproduction and recruitment of *Gila* spp. and Colorado pikeminnow (*Ptychocheilus lucius*) in the middle Green River. Final Report of Utah Division of Wildlife Resources to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Dill, W. A. 1944. The fishery of the lower Colorado River. California Fish and Game 30:109-211.
- Haines, O. B., and H. M. Tyus. 1990. Fish associations and environmental variables in age-0 Colorado squawfish habitats, Green River, Utah. Journal of Freshwater Ecology 5:427-436.
- Hamilton, S.J., and R.H. Wiedmeyer. 1990. Bioaccumulation of a mixture of boron, molybdenum, and selenium in chinook salmon. Transactions of the American Fisheries Society 119:500-510.
- Hamilton, S. J., K. J. Buhl, F. A. Bullard, and S. F. McDonald. 1996. Evaluation of toxicity to larval razorback sucker of selenium-laden food organisms from Ouray NWR on the Green River, Utah. Final Report to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

- Hamilton, S. J., and B. Waddell. 1994. Selenium in eggs and milt of razorback sucker (*Xyrauchen texanus*) in the middle Green River, Utah. *Archives of Environmental Contamination and Toxicology* 27:195-201.
- Hamman, R. L. 1981. Spawning and culture of Colorado squawfish in raceways. *Progressive Fish-Culturist* 43:173-177.
- Harvey, M. D., R. A. Mussetter, and E. J. Wick. 1993. A physical process biological-response model for spawning habitat formation for the endangered Colorado squawfish. *Rivers* 4:114-131.
- Hawkins, J. A., and J. O'Brien. 2001. Research plan for developing flow recommendations in the Little Snake River, Colorado and Wyoming, for endangered fishes of the Colorado River Basin. Colorado State University, Larval Fish Laboratory, final report to the Upper Colorado River Endangered Fish Recovery Program. Denver, Colorado.
- Holden, P. B. 1977. Habitat requirements of juvenile Colorado River squawfish. U.S. Fish and Wildlife Service Report FWS/OBS/77/65. Fort Collins, Colorado.
- Holden, P. B. (ed.). 1999. Flow recommendations for the San Juan River. San Juan River Basin Recovery Implementation Program, U.S. Fish and Wildlife Service, Albuquerque, New Mexico.
- Irving, D., and T. Modde. 2000. Home-range fidelity and use of historical habitat by adult Colorado squawfish (*Ptychocheilus lucius*) in the White River, Colorado and Utah. *Western North American Naturalist* 60:16-25.
- Johnson, B. L., W. B. Richardson, and T. J. Naimo. 1995. Past, present, and future concepts in large river ecology. *BioScience* 45:134-141.
- Joseph, T. W., J. A. Sinning, R. J. Behnke, and P. B. Holden. 1977. An evaluation of the status, life history, and habitat requirements of endangered and threatened fishes of the upper Colorado River system. U.S. Fish and Wildlife Service, Office Biological Services, Fort Collins, Colorado. 183 pp.
- Junk, W. J., P. B. Bailey, and R. E. Sparks. 1989. The flood pulse concept in river-floodplain systems. *Canadian Special Publication of Fisheries and Aquatic Sciences* 106:110-127.
- Lanigan, S. H., and C. R. Berry, Jr. 1979. Distribution and abundance of endemic fishes in the White River in Utah, final report. Contract #14-16-006-78-0925. U.S. Bureau of Land Management, Salt Lake City, Utah. 84 pp.
- McAda, C. W. 2000. [under revision] Flow recommendations to benefit endangered fishes in the Colorado and Gunnison rivers. Draft Final Report of U.S. Fish and Wildlife Service, Grand Junction, Colorado, to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- McAda, C. W., W. R. Elmblad, K. S. Day, M. A. Trammell, and T. E. Chart. 1997. Interagency Standardized Monitoring Program: summary of results, 1996. Final Report, Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

- McAda, C. W., J. W. Bates, J. S. Cranney, T. E. Chart, W. R. Elmblad, and T. P. Nessler. 1994a. Interagency Standardized Monitoring Program: summary of results, 1986-1992. Final Report, Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- McAda, C. W., J. W. Bates, J. S. Cranney, T. E. Chart, M. A. Trammel, and W. R. Elmblad. 1994b. Interagency Standardized Monitoring Program: summary of results, 1993. Annual Report, Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Meffe, G. K. 1985. Predation and species replacement on American southwestern fishes: a case study. *Southwestern Naturalist* 30(2):173-187.
- Miller, R. R. 1961. Man and the changing fish fauna of the American Southwest. *Papers of the Michigan Academy of Science, Arts, and Letters* 46:365-404.
- Minckley, W. L. 1982. Trophic Interrelations Among Introduced Fishes in the Lower Colorado River, Southwestern United States. *California Fish and Game* 68: 78-89.
- Minckley, W. L., and J. E. Deacon. 1968. Southwestern fishes and the enigma of "endangered species." *Science* 159:1424-1433.
- Moyle, P.B. 1976. *Inland fishes of California*. University of California Press, Berkeley, California.
- Muth, R. T., and D. E. Snyder. 1995. Diets of young Colorado squawfish and other small fish in backwaters of the Green River, Colorado and Utah. *Great Basin Naturalist* 55:95-104.
- Muth, R. T., L. W. Crist, K. E. LaGory, J. W. Hayse, K. R. Bestgen, T. P. Ryan, J. K. Lyons, R. A. Valdez. 2000. Flow and temperature recommendations for endangered fishes in the Green River downstream of Flaming Gorge Dam. Final Report to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Nesler, T. P., R. T. Muth, and A. F. Wasowicz. 1988. Evidence for baseline flow spikes as spawning cues for Colorado squawfish in the Yampa River, Colorado. *American Fisheries Society Symposium* 5:68-79.
- Nesler, T. P. 2000. Recovery of the Colorado River endangered fishes: biological recovery goals and criteria for Colorado pikeminnow, humpback chub, razorback sucker, and bonytail. Colorado Division of Wildlife, Denver, Colorado.
- O'Brien, J. S. 1984. 1983 Yampa River cobble reach morphology investigation. Final Report. U.S. Fish and Wildlife Service, Denver, Colorado. 79 pp.
- Osmundson, D. B. 2002. Dynamics of the upper Colorado River population of Colorado pikeminnow. Draft Final Report of U.S. Fish and Wildlife Service, Grand Junction, Colorado, to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

- Osmundson, D. B., P. Nelson, K. Fenton, and D. W. Ryden. 1995. Relationships between flow and rare fish habitat in the "15-Mile Reach" of the upper Colorado River. Final Report. U.S. Fish and Wildlife Service, Grand Junction, Colorado.
- Osmundson, D. B., R. J. Ryel, and T. E. Mourning. 1997. Growth and survival of Colorado squawfish in the Upper Colorado River. *Transaction of the American Fisheries Society* 126:687-698.
- Osmundson, D. B., and K. P. Burnham. 1998. Status and trends of the endangered Colorado squawfish in the upper Colorado River. *Transactions of the American Fisheries Society* 127:957-970.
- Osmundson, B. C., T. W. May, and D.B. Osmundson. 2000. Selenium concentrations in the Colorado pikeminnow (*Ptychocheilus lucius*): relationship with flows in the upper Colorado River. *Archives of Environmental Contamination and Toxicology* 38:479-485.
- Osmundson, D. B., and L. R. Kaeding. 1989. Studies of Colorado squawfish and razorback sucker use of the "15-mile reach" of the upper Colorado River as part of conservation measures for the Green Mountain and Ruedi Reservoir water sales. Final Report of U.S. Fish and Wildlife Service Colorado River Fishery Project, Grand Junction, Colorado.
- Osmundson, D. B., and L. R. Kaeding. 1991. Flow recommendations for maintenance and enhancement of rare fish habitat in the 15-mile reach during October-June. Final Report. U.S. Fish and Wildlife Service, Grand Junction, Colorado.
- Propst, D. L., and K. R. Bestgen. 1991. Habitat and biology of the loach minnow, *Tiaroga cobitis*, in New Mexico. *Copeia* 1991(1):29-30.
- Pucherelli, M. J., R. C. Clark, and R. D. Williams. 1990. Mapping backwater habitat on the Green River as related to the operation of Flaming Gorge Dam using remote sensing and GIS. *U.S. Bureau of Reclamation* 90 (18):1-11.
- Rakowski, C. L., and J. C. Schmidt. 1999. The geomorphic basis of Colorado pikeminnow nursery habitat in the Green River near Ouray, Utah. Report A in Flaming Gorge Studies: Assessment of Colorado pikeminnow nursery habitat in the Green River. Final Report of Utah Division of Wildlife Resources to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Rinne, J. N. 1991. Habitat use by spinedace, *Meda fulgida* (Pisces: Cyprinidae) in southwestern streams with reference to probable habitat competition by red shiner (Pisces: Cyprinidae). *Southwestern Naturalist* 36(1):7-13.
- Ryden, D. W., and L. A. Ahlm. 1996. Observations on the distribution and movements of Colorado squawfish, *Ptychocheilus lucius*, in the San Juan River, New Mexico, Colorado, and Utah. *Southwestern Naturalist* 41:161-168.
- Seethaler, K. 1978. Life history and ecology of the Colorado squawfish (*Ptychocheilus lucius*) in the upper Colorado River basin. Master's Thesis. Utah State University, Logan, Utah.

- Stephens, D. W., B. Waddell, L. A. Peltz, and J. B. Miller. 1992. Detailed study of selenium and select elements in water, bottom sediment, and biota associated with irrigation drainage in the middle Green River basin, Utah, 1988–90. Water-Resources Investigation Report 92-4084. U.S. Geological Survey, Salt Lake City, Utah.
- Stephens, D. W., and B. Waddell. 1998. Selenium sources and effects on biota in the Green River basin of Wyoming, Colorado, and Utah. Pages 183–203 in W.J. Frankenberg and R.A. Engberg (eds.). Environmental chemistry of selenium. Marcel Dekker, New York, New York.
- Trammell, M. A., and T. E. Chart. 1999. Colorado pikeminnow young-of-the year habitat use, Green River, Utah, 1992-1996. Report C in Flaming Gorge Studies: Assessment of Colorado pikeminnow nursery habitat in the Green River. Final Report of Utah Division of Wildlife Resources to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Tyus, H. M. 1985. Homing behavior noted for Colorado squawfish. *Copeia* 1985:213-215.
- Tyus, H. M. 1990. Potamodromy and reproduction of Colorado squawfish in the Green River basin, Colorado and Utah. *Transactions of the American Fisheries Society* 119:1035-1047.
- Tyus, H. M. 1991. Ecology and management of Colorado squawfish. Pages 379–402 in W.L. Minckley and J.E. Deacon (eds.). Battle against extinction: native fish management in the American west. The University of Arizona Press, Tucson, Arizona.
- Tyus, H. M., and G. B. Haines. 1991. Distribution, habitat use, and growth of age-0 Colorado squawfish in the Green River basin, Colorado and Utah. *Transactions of the American Fisheries Society* 120:79-89.
- Tyus, H. M., and C. A. Karp. 1989. Habitat use and streamflow needs of rare and endangered fishes, Yampa River, Colorado. U.S. Fish and Wildlife Service Biological Report 89(14): 1-27.
- Tyus, H. M., and C. W. McAda. 1984. Migration, movements, and habitat preferences of Colorado squawfish, *Ptychocheilus lucius*, in the Green, White, and Yampa Rivers, Colorado and Utah. *Southwestern Naturalist* 29:289-299.
- Tyus, H. M., and J. F. Saunders. 1996. Nonnative fishes in the upper Colorado River basin and a strategic plan for their control. Final Report of University of Colorado Center for Limnology to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Tyus, H. M., B.D. Burdick, R. A. Valdez, C. M. Haynes, T. A. Lytle, and C. R. Berry. 1982. Fishes of the upper Colorado River basin: distribution, abundance, and status. Pages 12–70 in W.H. Miller, H.M. Tyus, and C.A. Carlson (eds.). Fishes of the upper Colorado River system: present and future. Western Division, American Fisheries Society, Bethesda, Maryland.

- U.S. Fish and Wildlife Service (USFWS). 1994. Determination of critical habitat for four endangered Colorado River fishes. Federal Register 59(54):13374-13400.
- U.S. Fish and Wildlife Service (USFWS). 2002c. Colorado pikeminnow (*Ptychocheilus lucius*) Recovery Goals: amendment and supplement to the Colorado Squawfish Recovery Plan. U.S. Fish and Wildlife Service, Mountain-Prairie Region (6), Denver, Colorado.
- Valdez, R. A., and W. J. Masslich. 1989. Winter habitat study of endangered fish — Green River: wintertime movement and habitat of adult Colorado squawfish and razorback suckers. Final Report of BIO/WEST, Inc. to U.S. Bureau of Reclamation, Salt Lake City, Utah.
- Vanicek, C. D., and R. H. Kramer. 1969. Life history of the Colorado squawfish, *Ptychocheilus lucius*, and the Colorado chub, *Gila robusta*, in the Green River in Dinosaur National Monument 1964-1966. Transactions of the American Fisheries Society 98:193-208.

Humpback chub

- Archer, D. L., L. R. Kaeding, B. D. Burdick, and C. W. McAda. 1985. A study of the endangered fishes of the Upper Colorado River. Final Report - Cooperative Agreement 14-16-0006-82-959. U.S. Department of the Interior, Fish and Wildlife Service, Grand Junction, Colorado. 134 pp.
- Arizona Game and Fish Department. 1996. The ecology of Grand Canyon backwaters. Final Report to U.S. Bureau of Reclamation, Upper Colorado Region, Glen Canyon Environmental Studies, Flagstaff, Arizona.
- Bestgen, K. R., and L. W. Crist. 2000. Response of the Green River fish community to construction and re-regulation of Flaming Gorge Dam, 1962-1996. Final Report of Colorado State University Larval Fish Laboratory to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Binns, N. A. 1967. Effects of rotenone treatment on the fauna of the Green River, Wyoming. Wyoming Game and Fish Commission, Fisheries Technical Bulletin 1:1-1 14.
- Bookstein, F., B. Chernoff, R. Elder, J. Humphries, G. Smith and R. Strauss. 1985. Morphometrics in Evolutionary Biology. Special Publication 15. The Academy of Natural Sciences Press, Philadelphia, Pennsylvania. 277 pp.
- Bosley, C. E. 1960. Pre-impoundment study of the Flaming Gorge Reservoir. Wyoming Game and Fish Commission, Fisheries Technical Report 9:1-81.
- Burdick, B. D. and L. R. Kaeding. 1985. Reproductive ecology of the humpback chub and the roundtail chub in the Upper Colorado River. Proceedings of the Annual Conference of Western Association of Game and Fish Agencies. 65:163 (abstract).
- Chart, T. E., and L. Lentsch. 1999a. Flow effects on humpback chub (*Gila cypha*) in Westwater Canyon. Final Report of Utah Division of Wildlife Resources to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

- Chart, T. E., and L. D. Lentsch. 1999b. Reproduction and recruitment of *Gila* spp. and Colorado pikeminnow (*Ptychocheilus lucius*) in the middle Green River 1992–1996. Final Report to the Recovery Program for the Endangered Fishes in the Upper Colorado River Basin, Project Number 39. Utah Division of Wildlife Resources, Monticello and Salt Lake City, Utah.
- Chart, T. E., and L. D. Lentsch. 2000. Reproduction and recruitment of *Gila* spp. and Colorado pikeminnow (*Ptychocheilus lucius*) in the middle Green River 1992—1996. Report C in Flaming Gorge Studies: reproduction and recruitment of *Gila* spp. and Colorado pikeminnow (*Psychocheilus lucius*) in the middle Green River. Final Report of Utah Division of Wildlife Resources to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Douglas, M. E., and P. C. Marsh. 1996. Population estimates/population movements of *Gila cypha*, an endangered cyprinid fish in the Grand Canyon region of Arizona. *Copeia* 1996:15-28.
- Euler, R. C. 1978. Archaeological and paleobiological studies at Stanton's Cave, Grand Canyon National Park, Arizona. A report of progress. Pages 141–162 in National Geographic Society Research Report, 1978.
- Gaufin, A. R., G. R. Smith, and P. Dotson. 1960. Aquatic survey of the Green River and tributaries within the Flaming Gorge Reservoir basin, Appendix A. Pages 139B162 in A.M. Woodbury (ed.) Ecological studies of the flora and fauna of Flaming Gorge Reservoir basin, Utah and Wyoming. University of Utah Anthropological Papers 48.
- Girard, C. 1856. Researches upon the cyprinoid fishes inhabiting the fresh waters of the United States of America, west of the Mississippi Valley, from specimens in the museum of the Smithsonian Institution. *Academy of Natural Science of Philadelphia Proceedings* 8:165–213.
- Gorman, O. T., and D. M. Stone. 1999. Ecology of spawning humpback chub, *Gila cypha*, in the Little Colorado River near Grand Canyon, Arizona. *Environmental Biology of Fishes* 55(1-2): 115-133.
- Hamman, R. L. 1982. Spawning and culture of humpback chub. *Progressive Fish-Culturist* 44:213-216.
- Holden, P. B. 1968. Systematic studies of the genus *Gila* (Cyprinidae) of the Colorado River Basin. Master's Thesis. Utah State University, Logan, Utah.
- Holden, P. B. 1973. Distribution, abundance, and life history of the fishes of the upper Colorado River basin. Ph.D. Dissertation. Utah State University, Logan, Utah.
- Holden, P. B., and C. B. Stalnaker. 1970. Systematic studies of the cyprinid genus *Gila* in the Upper Colorado River Basin. *Copeia* 1970(3):409-420.

- Holden, P. B., and L. W. Crist. 1981. Documentation of changes in the macroinvertebrate and fish populations in the Green River due to inlet modification of Flaming Gorge Dam. Final Report PR-16-5 of Bio/West, Inc., Logan, Utah, to U.S. Fish and Wildlife Service, Salt Lake City, Utah.
- Holden, P. B. and C. B. Stalnaker. 1975. Distribution of fishes in the Dolores and Yampa River systems of the Upper Colorado Basin. *Southwestern Naturalist* 19:403-412.
- Jones, A. T. 1985. A cross section of Grand Canyon archaeology: excavations at five sites along the Colorado River. Western Archaeological and Conservation Center Publication in Anthropology Number 28.
- Kaeding, L. R., and M. A. Zimmerman. 1983. Life history and ecology of the humpback chub in the Little Colorado and Colorado Rivers of the Grand Canyon. *Transactions of the American Fisheries Society* 112:577-594.
- Kaeding, L. R., B. D. Burdick, P. A. Schrader, and C. W. McAda. 1990. Temporal and Spatial Relations between the Spawning of Humpback Chub and Roundtail Chub in the Upper Colorado River. *Transactions of the American Fish Society* 119:135-144.
- Karp, C. A., and Tyus, H. M. 1990. Humpback chub (*Gila cypha*) in the Yampa and Green Rivers, Dinosaur National Monument, with observations on roundtail chub (*G. robusta*) and other sympatric fishes. *Great Basin Naturalist* 50:257-264.
- Kidd, G. T. 1977. An investigation of endangered and threatened fish species in the upper Colorado River as related to Bureau of Reclamation projects. Final Report to U.S. Bureau of Reclamation. Northwest Fishery Research, Clifton, Colorado.
- Kolb, E., and E. Kolb. 1914. Experiences in the Grand Canyon. *The National Geographic Magazine*, Vol. XXVI (2):99-184.
- Kubly, D. M. 1990. The endangered humpback chub *Gila cypha* in Arizona: a review of past and suggestions for future research. Arizona Game and Fish Department, Phoenix, Arizona.
- Maddux, H. R, D. M. Kubly, J. C. deVos, W. R. Persons, R. Staedicke, and R. L. Wright. 1987. Evaluation of varied flow regimes on aquatic resources of Glen and Grand Canyon. Final Report of Arizona Game and Fish Department to U.S. Bureau of Reclamation, Glen Canyon Environmental Studies, Salt Lake City, Utah.
- Marsh, P. C. 1985. Effect of Incubation Temperature on Survival of Embryos of Native Colorado River Fishes. *Southwestern Naturalist* 30(1):129-140.
- McDonald, D. B., and P. A. Dotson. 1960. Pre-impoundment investigation of the Green River and Colorado River developments. *In* Federal aid in fish restoration investigations of specific problems in Utah's fishery. Federal Aid Project No. F-4-R-6, Departmental Information Bulletin No. 60-3. State of Utah, Department of Fish and Game, Salt Lake City, Utah.

- Miller, R. R. 1944. [Unpubl. Manuscript. Letter dated 28, August 1944, pertaining to a list of fishes occurring in Grand Canyon National Park] preliminary checklist.
- Miller, R. R. 1946. *Gila cypha*, a remarkable new species of cyprinid fish from the Colorado River in Grand Canyon, Arizona. *Journal of the Washington Academy of Science* 36(12):409-415.
- Miller, R. R. 1955. Fish remains from archaeological sites in the lower Colorado River basin, Arizona. *Papers of the Michigan Academy of Science, Arts and Letters* 40:125-126.
- Miller, R. R., and G. R. Smith. 1972. Fishes collected on the Grand Canyon survey, Lees Ferry to Diamond Creek, August 1968. Unpublished manuscript.
- Miller, R. R., and G. R. Smith. 1984. Fish remains from Stanton's Cave, Grand Canyon of the Colorado, Arizona, with notes on the taxonomy of *G. cypha*. Pages 61-65 in *The archeology, geology and paleobiology of Stanton's Cave, in Grand Canyon National Park, Arizona*, edited by R.C. Euler. Grand Canyon National History Association Monograph 6, Grand Canyon, Arizona.
- Miller, A. S., and W. A. Hubert. 1990. Compendium of existing knowledge for use in making habitat management recommendations for the upper Colorado River basin. Final Report of U.S. Fish and Wildlife Service Wyoming Cooperative Fish and Wildlife Research Unit to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Miller, W. H., J. J. Valentine, D. L. Archer, H. M. Tyus, R. A. Valdez, and L. R. Kaeding. 1982. Colorado River Fishery Project Final Report Summary. U.S. Fish and Wildlife Service, Salt Lake City, Utah. 42 pp.
- Minckley, W. L. 1973. *Fishes of Arizona*. Arizona Game and Fish Department, Phoenix, Arizona. 293 pp.
- Minckley, C. O. 1996. Observations on the biology of the humpback chub in the Colorado River Basin, 1908-1990. Doctoral Dissertation. Northern Arizona University, Flagstaff, Arizona.
- Minckley, C. O., and D. W. Blinn. 1976. Summer distribution and reproductive status of fish of the Colorado River and its tributaries in Grand Canyon National Park and vicinity, 1975. Final Report to the National Park Service, Contribution No. 42.
- Minckley, W. L., D. A. Hendrickson, and C. E. Bond. 1986. Geography of Western North America Freshwater Fishes: Description and Relationships to Intracontinental Tectonism. pp 519-613 In: C.H. Hocutt and E.O. Wiley (eds.). *The Zoogeography of North American Freshwater Fishes*. Wiley-Interscience, New York, New York.
- Robinson, A. T., R. W. Clarkson, and R. E. Forrest. 1998. Dispersal of larval fishes in a regulated river tributary. *Transactions of the American Fisheries Society* 127:722-786.
- Sigler, W. F., and R. R. Miller. 1963. *Fishes of Utah*. Utah Department of Fish and Game, Salt Lake City, Utah. 203 pp.

- Sitgreaves, L. 1853. Report of an expedition down the Zuni and Colorado Rivers. 32nd Congress, 2nd Session, Executive No. 59, Washington, D.C.
- Smith, G. R. 1960. Annotated list of fish of the Flaming Gorge Reservoir Basin, 1959. Pages 163-268 in R.M. Woodbury, ed. Ecological Studies of the Flora and Fauna of Flaming Gorge Reservoir Basin, Utah and Wyoming. Department of Anthropology, University of Utah, Salt Lake City. Anthropological Paper Number 48, Series Number 3.
- Snyder, D. E. 1981. Contributions to a guide to the cypriniform fish larvae of the upper Colorado River system in Colorado. U.S. Bureau of Land Management Biological Science Series 3:1-81.
- Stone, J. L. 1964. Limnological study of Glen Canyon tailwater area of the Colorado River. Colorado River Storage Project, Public Law 485, Section 8, Annual Report. U.S. Bureau of Reclamation, Salt Lake City, Utah.
- Stone, J. L. 1966. Tailwater fisheries investigations creel census and limnological study of the Colorado River below Glen Canyon Dam July 1, 1965–June 30, 1966. Arizona Game and Fish Department, Phoenix, Arizona.
- Stone, J. L. and A. B. Queenan. 1967. Tailwater fisheries investigations: creel census and limnological study of the Colorado River below Glen Canyon Dam. Colorado River Storage Project, Public Law 485, Section 8, Annual Report of Arizona Game and Fish Department to U.S. Bureau of Reclamation, Salt Lake City, Utah.
- Stone, J. L., and N. L. Rathbun. 1968. Tailwater fisheries investigations: creel census and limnological study of the Colorado River below Glen Canyon Dam. Arizona Game and Fish Department, Phoenix, Arizona.
- Suttkus, R. D., and G. H. Clemmer. 1977. The humpback chub, *Gila cypha*, in the Grand Canyon area of the Colorado River. Occasional Papers of the Tulane University Museum of Natural History, New Orleans, Louisiana 1:1–30.
- Suttkus, R. D., G. H. Clemmer, C. Jones, and C. Shoop. 1976. Survey of the fishes, mammals and herpetofauna of the Colorado River in Grand Canyon. Colorado River Research Series Contribution 34. Grand Canyon National Park, Grand Canyon, Arizona.
- Tyus, H. M. 1998. Early records of the endangered fish *Gila cypha*, Miller, from the Yampa River of Colorado with notes on its decline. *Copeia* 1998:190-193.
- Tyus, H. M., and C. A. Karp. 1989. Habitat Use and Streamflow Needs of Rare and Endangered Fishes, Yampa River, Colorado. U.S. Fish and Wildlife Service, Biology Report 89(14). 27 pp.
- U.S. Fish and Wildlife Service (USFWS). 1986. Annual report to the Bureau of Reclamation: Colorado River endangered fishes investigations. U.S. Department of the Interior, Fish and Wildlife Service, Division of Endangered Species, Denver, Colorado.
- U.S. Fish and Wildlife Service (USFWS). 1990. Humpback Chub Recovery Plan. U.S. Fish and Wildlife Service, Denver, Colorado. 43 pp.

- U.S. Fish and Wildlife Service (USFWS). 1994. Determination of critical habitat for four endangered Colorado River fishes. Federal Register 59(54):13374-13400.
- U.S. Fish and Wildlife Service (USFWS). 2002b. Humpback chub (*Gila cypha*) Recovery Goals: amendment and supplement to the Humpback Chub Recovery Plan. U.S. Fish and Wildlife Service, Mountain-Prairie Region (6), Denver, Colorado.
- Uyeno, T., and Miller, R. R. 1965. Middle Pliocene fishes from the Bidahochi Formation, Arizona. Copeia 1965:28-41.
- Valdez, R.A., and G. H. Clemmer. 1982. Life History and prospects for recovery of the humpback and bonytail chub. Pages 109-119 in W.M. Miller, H.M. Tyus and C.A. Carlson, eds. Proceedings of a Symposium on Fishes of the Upper Colorado River System: Present and Future. American Fisheries Society, Bethesda, Maryland.
- Valdez, R. A., P. G. Mangan, R. Smith, and B. Nilson. 1982. Upper Colorado River fisheries investigations (Rifle, Colorado to Lake Powell, Utah). Pages 100-279 in W.H. Miller, J.J. Valentine, D.L. Archer, H.M. Tyus, R.A. Valdez, and L. Kaeding, eds. Part 2-Field investigations. Colorado River Fishery Project. U.S. Bureau of Reclamation, Salt Lake City, Utah.
- Valdez, R. A., P. B. Holden, and T. B. Hardy. 1990. Habitat suitability index curves for humpback chub of the Upper Colorado River Basin. Rivers 1:31-42.
- Valdez, R. A., and R. J. Ryel. 1995. Life History and Ecology of the Humpback Chub (*Gila cypha*) in the Colorado River, Grand Canyon, Arizona. BIO/WEST, Inc. for the Bureau of Reclamation.
- Valdez, R. A., and R. J. Ryel. 1997. Life history and ecology of the humpback chub in the Colorado River in Grand Canyon, Arizona. Pages 3B31 in C. van Riper, III and E.T. Deshler (eds.). Proceedings of the Third Biennial Conference of Research on the Colorado Plateau. National Park Service Transactions and Proceedings Series 97/12.
- Vanicek, C. D., R. H. Kramer, and D. R. Franklin. 1970. Distribution of Green River fishes in Utah and Colorado following closure of Flaming Gorge dam. Southwestern Naturalist 14:297-315.
- Wallis, O. L. 1951. The status of the fish fauna of the Lake Mead National Recreation Area, Arizona-Nevada. Transactions of the American Fisheries Society 80:84-92.
- Wick, E. J., D. E. Snyder, D. Langlois, and T. Lytle. 1979. Colorado squawfish and humpback chub population and habitat monitoring. Federal Aid to Endangered Wildlife Job Progress Report. SE-3-2. Colorado Division of Wildlife, Denver, Colorado. 56 pp. + appendices.
- Wick, E. J., T. A. Lytle, and C. M. Haynes. 1981. Colorado squawfish and humpback chub population and habitat monitoring, 1979-1980. Progress Report, Endangered Wildlife Investigations. SE-3-3. Colorado Division of Wildlife, Denver, Colorado. 156 pp.

Wick, E. J., J. A. Hawkins, and T. P. Nesler. 1991. Occurrence of two endangered fishes in the Little Snake River, Colorado. *Southwestern Naturalist* 36:251-254.

Razorback chub

California Behnke, R. J. Benson, and D. E. Benson. 1983. Endangered and threatened fishes of the Upper Colorado River Basin. Colorado State University Cooperative Extension Service Bulletin 503A.

Bestgen, K. R. 1990. Status Review of the Razorback Sucker, *Xyrauchen texanus*. Larval Fish Laboratory #44. Colorado State University, Ft. Collins, Colorado.

Bestgen, K. R., D.W. Beyers, G.B. Haines, and J.A. Rice. 1997. Recruitment models for Colorado squawfish: tools for evaluating relative importance of natural and managed processes. Final Report of Colorado State University Larval Fish Laboratory to U.S. National Park Service Cooperative Parks Unit and U.S. Geological Survey Midcontinent Ecological Science Center, Fort Collins, Colorado.

Bestgen, K. R., G. B. Haines, R. Brunson, T. Chart, M. Trammell, R. T. Muth, G. Birchell, K. Christopherson, and J. M. Bundy. 2002. Status of wild razorback sucker in the Green River Basin, Utah and Colorado, determined from basinwide monitoring and other sampling programs. Draft Report of Colorado State University Larval Fish Laboratory to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

Bulkley, R. V., and R. Pimentel. 1983. Temperature preference and avoidance by adult razorback suckers. *Transactions of the American Fisheries Society* 112:601-607

Burdick, B. D., and R. B. Bonar. 1997. Experimental stocking of adult razorback sucker in the upper Colorado and Gunnison rivers. Final Report to the Recovery Program for the Endangered Fishes of the Upper Colorado River, Project Number 50. U.S. Fish and Wildlife Service, Grand Junction, Colorado.

Burke, T. 1994. Lake Mohave native fish rearing program. U.S. Bureau of Reclamation, Boulder City, Nevada.

Carlson, C. A., and R. T. Muth. 1989. The Colorado River lifeline of the American Southwest. Canadian Special Publication of Fisheries and Aquatic Sciences 106:220-239.

Chart, T. E., D. P. Svendsen, and L. D. Lentsch. 1999. Investigation of potential razorback sucker (*Xyrauchen texanus*) and Colorado squawfish (*Ptychocheilus lucius*) spawning in the lower Green River, 1994 and 1995. Final Report to the Recovery Program for the Endangered Fishes in the Upper Colorado River Basin, Project Number 38. Report Number 99-32, Utah Division of Wildlife Resources, Salt Lake City, Utah.

Clarkson, R. W., E. D. Creef, and D. K. McGuinn-Robbins. 1993. Movements and habitat utilization of reintroduced razorback suckers (*Xyrauchen texanus*) and Colorado squawfish (*Ptychocheilus lucius*) in the Verde River, Arizona. Special Report. Nongame and Endangered Wildlife Program, Arizona Game and Fish Department, Phoenix, Arizona.

- Ellis, N. M. 1914. Fishes of Colorado. University of Colorado Studies. Vol. 11(1).
- Gutermuth, F. B., L. D. Lentsch, and K. R. Bestgen. 1994. Collection of Age-0 Razorback Suckers (*Xyrauchen texanus*) in the Lower Green River, Utah. *Southwestern Naturalist* 39 (4).
- Holden, P.B. 1994. Razorback sucker investigations in Lake Mead, 1994. Report of Bio/West, Inc., Logan, Utah, to Southern Nevada Water Authority.
- Holden, P.B. (ed.) 1999. Flow recommendations for the San Juan River. San Juan River Basin Recovery Implementation Program, U.S. Fish and Wildlife Service, Albuquerque, New Mexico.
- Holden, P. B., and L. W. Crist. 1981. Documentation of changes in the macroinvertebrate and fish populations in the Green River due to inlet modification of Flaming Gorge Dam. Final Report PR-16-5 of Bio/West, Inc., Logan, Utah, to U.S. Fish and Wildlife Service, Salt Lake City, Utah.
- Hubbs, C. L., and R. R. Miller. 1953. Hybridization in nature between the fish genera *Catostomus* and *Xyrauchen*. *Papers of the Michigan Academy of Arts, Science and Letters* 38:207B233.
- Irving, D. B., and B. D. Burdick. 1995. Reconnaissance inventory and prioritization of existing and potential bottomlands in the upper Colorado River basin, 1993–1994. Final Report to the Recovery Program for the Endangered Fishes of the Upper Colorado River. U.S. Fish and Wildlife Service, Vernal, Utah and Grand Junction, Colorado.
- Jonez, A., and R. C. Sumner. 1954. Lakes Mead and Mohave investigations: a comparative study of an established reservoir as related to a newly created impoundment. Final Report. Federal Aid Wildlife Restoration (Dingell-Johnson) Project F-1-R, Nevada Game and Fish Commission, Carson City, Nevada.
- Jordan, D. S. 1891. Report of explorations in Colorado and Utah during the summer of 1889 with an account of the fishes found in each of the river basins examined. *Bulletin of the United States Fish Commission* 9:24.
- Joseph, T. W., J. A. Sinning, R. J. Behnke, and P. B. Holden. 1977. An evaluation of the status, life history, and habitat requirements of endangered and threatened fishes of the upper Colorado River system. U.S. Fish and Wildlife Service, Office Biological Services, Fort Collins, Colorado. 183 pp.
- Lanigan, S. H., and H. M. Tyus. 1989. Population size and status of the razorback sucker in the Green River basin, Utah and Colorado. *North American Journal of Fisheries Management* 9:1.
- Mabey, L. W., and D. K. Shiozawa. 1993. Planktonic and benthic microcrustaceans from floodplain and river habitats of the Ouray Refuge on the Green River, Utah. Department of Zoology, Brigham Young University, Provo, Utah.

- Marsh, P. C. 1987. Food of adult razorback sucker in Lake Mohave, Arizona-Nevada. *Transactions of the American Fisheries Society* 116:117B119.
- Marsh, P. C. 1993. Draft biological assessment on the impact of the Basin and Range Geoscientific Experiment (BARGE) on federally listed fish species in Lake Mead, Arizona and Nevada. Arizona State University, Center for Environmental Studies, Tempe, Arizona.
- Marsh, P. C., and W. L. Minckley. 1989. Observations on recruitment and ecology of razorback sucker: lower Colorado River, Arizona-California-Nevada. *Great Basin Naturalist* 49: 71-78.
- McAda, C. W. and R. S. Wydoski. 1980. The razorback sucker, *Xyrauchen texanus*, in the Upper Colorado River Basin, 1974-1976. Technical Papers of the U.S. Fish and Wildlife Service 99. U.S. Fish and Wildlife Service, Washington, D.C.
- Miller, R. R. 1961. Man and the changing fish fauna of the American Southwest. *Papers of the Michigan Academy of Science, Arts, and Letters* 46:365-404.
- Miller, A. S., and W. A. Hubert. 1990. Compendium of existing knowledge for use in making habitat management recommendations for the upper Colorado River basin. Final Report of U.S. Fish and Wildlife Service Wyoming Cooperative Fish and Wildlife Research Unit to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Minckley, W. L. 1983. Status of razorback sucker, *Xyrauchen texanus* (Abbott), in the Lower Colorado River Basin. *Southwestern Naturalist* 28:165-187.
- Minckley, W. L., P. C. Marsh, J. E. Brooks, J. E. Johnson, and B. L. Jensen. 1991. "Management Toward Recovery of Razorback Sucker *Xyrauchen texanus*." In *Battle Against Extinction*, W.L. Minckley and J.E. Deacon (eds), University of Arizona Press, Tucson, Arizona, pp. 303-357.
- Modde, T. 1996. Juvenile razorback sucker (*Xyrauchen texanus*) in a managed wetland adjacent to the Green River. *Great Basin Naturalist* 56:375-376.
- Modde, T. 1997. Fish use of Old Charlie Wash: an assessment of floodplain wetland importance to razorback sucker management and recovery. Final report of U.S. Fish and Wildlife Service, Vernal, Utah, to Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Modde, T. and D. B. Irving. 1998. Use of multiple spawning sites and seasonal movements by razorback sucker in the middle Green River, Utah. *North American Journal of Fisheries Management* 18:318-326.
- Modde, T., and G. Smith. 1995. Flow recommendations for endangered fishes in the Yampa River. Final Report of U.S. Fish and Wildlife Service, Vernal, Utah, to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

- Modde, T., and E. J. Wick. 1997. Investigations of razorback sucker distribution movements and habitats used during spring in the Green River, Utah. Final Report of U.S. Fish and Wildlife Service, Vernal, Utah, to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Modde, T., K. P. Burnham, and E. J. Wick. 1996. Population status of the razorback sucker in the middle Green River. *Conservation Biology* 10: 110-119.
- Moyle, P. B. 1976. *Inland fishes of California*. University of California Press, Berkeley, California.
- Muth, R. T. 1995. Conceptual-framework document for development of a standardized monitoring program for basin-wide evaluation of restoration activities for razorback sucker in the Green and Upper Colorado River systems. Colorado State University Larval Fish Laboratory final report to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin, Denver, Colorado.
- Muth, R. T. and E. J. Wick. 1997. Field studies on larval razorback sucker in Canyonlands National Park and Glen Canyon National Recreation Area, 1993 – 1995. Final Report of Colorado State University Larval Fish Laboratory to U.S. Park Service Rocky Mountain Region, Denver, Colorado.
- Muth, R. T., G. B. Haines, S. M. Meisner, E. J. Wick, T. E. Chart, D. E. Snyder, and J. M. Bundy. 1998. Reproduction and early life history of razorback sucker in the Green River, Utah and Colorado, 1992-1996. Final Report of Colorado State University Larval Fish Laboratory to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Muth, R. T., L. W. Crist, K. E. LaGory, J. W. Hayse, K. R. Bestgen, T. P. Ryan, J. K. Lyons, R. A. Valdez. 2000. Flow and temperature recommendations for endangered fishes in the Green River downstream of Flaming Gorge Dam. Final Report to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Osmundson, D. B. 2002. Dynamics of the upper Colorado River population of Colorado pikeminnow. Draft Final Report of U.S. Fish and Wildlife Service, Grand Junction, Colorado, to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Osmundson, D. B., and L. R. Kaeding. 1989. Studies of Colorado squawfish and razorback sucker use of the "15-mile reach" of the Upper Colorado River as part of conservation measures for the Green Mountain and Ruedi Reservoir water sales. Final Report. U.S. Fish and Wildlife Service, Grand Junction, Colorado.
- Osmundson, D. B., and L. R. Kaeding. 1991. Flow recommendations for maintenance and enhancement of rare fish habitat in the 15-mile reach during October-June. Final Report. U.S. Fish and Wildlife Service, Grand Junction, Colorado.

- Platania, S. P. 1990. Biological summary of the 1987 to 1989 New Mexico-Utah ichthyofaunal study of the San Juan River. Unpublished report to the New Mexico Department of Game and Fish, Santa Fe, and the U.S. Bureau of Reclamation, Salt Lake City, Utah, Cooperative Agreement 7-FC-40-05060.
- Platania, S. P., and D. A. Young. 1989. A survey of the ichthyofauna of the San Juan and Animas rivers from Archuleta and Cedar Hill (respectively) to their confluence at Farmington, New Mexico. Department of Biology, University of New Mexico, Albuquerque, New Mexico.
- Ruppert, J. B., R. T. Muth, and T. P. Nesler. 1993. Predation on fish larvae by adult red shiner, Yampa and Green rivers, Colorado. *Southwestern Naturalist* 38:397B399.
- Ryden, D. W. 2000. Monitoring of experimentally stocked razorback sucker in the San Juan River: March 1994 through October 1997. U.S. Fish and Wildlife Service, Colorado River Fishery Project, Grand Junction, Colorado.
- Sigler, W. F., and R. R. Miller. 1963. Fishes of Utah. Utah Department of Fish and Game, Salt Lake City, Utah. 203 pp.
- Sublette, J. S., M. D. Hatch, and M. Sublette. 1990. The fishes of New Mexico. University of New Mexico Press, Albuquerque, New Mexico.
- Taba, S. S., J. R. Murphy, and H. H. Frost. 1965. Notes on the fishes of the Colorado River near Monticello, Utah. *Proceedings of the Utah Academy of Sciences, Arts, and Letters* 42(2):280-283.
- Tyus, H. M. 1987. Distribution, reproduction, and habitat use of the razorback sucker in the Green River, Utah, 1979-1986. *Transactions of the American Fisheries Society* 116:111-116.
- Tyus, H. M., and C. A. Karp. 1989. Habitat Use and Streamflow Needs of Rare and Endangered Fishes, Yampa River, Colorado. U.S. Fish and Wildlife Service, Biology Report 89(14). 27 pp.
- Tyus, H. M., and C. A. Karp. 1990. Spawning and movements of razorback sucker, *Xyrauchen texanus*, in the Green River Basin of Colorado and Utah. *Southwestern Naturalist* 35:427B433.
- Tyus, H. M., and C. A. Karp. 1991. Habitat use and streamflow needs of rare and endangered fishes in the Green River, Utah. Final Report. Flaming Gorge Studies Program. U.S. Fish and Wildlife Service, Colorado River Fish Project, Vernal, Utah.
- U.S. Fish and Wildlife Service (USFWS). 1991. Endangered and threatened wildlife and plants; the razorback sucker (*Xyrauchen texanus*) determined to be an endangered species. *Federal Register* 56(205): 54957-54967.
- U.S. Fish and Wildlife Service (USFWS). 1994. Determination of critical habitat for four endangered Colorado River fishes. *Federal Register* 59(54):13374-13400.

- U.S. Fish and Wildlife Service (USFWS). 1998. Razorback sucker *Xyrauchen texanus* recovery plan. Denver, Colorado.
- U.S. Fish and Wildlife Service (USFWS). 2002d. Razorback sucker (*Xyrauchen texanus*) Recovery Goals: amendment and supplement to the Razorback Sucker Recovery Plan. U.S. Fish and Wildlife Service, Mountain-Prairie Region (6), Denver, Colorado.
- Valdez, R. A., and W. J. Masslich. 1989. Winter habitat study of endangered fish — Green River: wintertime movement and habitat of adult Colorado squawfish and razorback suckers. Final Report of BIO/WEST, Inc. to U.S. Bureau of Reclamation, Salt Lake City, Utah.
- Valdez, R. A., P. G. Mangan, R. Smith, and B. Nilson. 1982. Upper Colorado River fisheries investigations (Rifle, Colorado to Lake Powell, Utah). Pages 100-279 in W.H. Miller, J.J. Valentine, D. L. Archer, H. M. Tyus, R. A. Valdez, and L. Kaeding, eds. Part 2-Field investigations. Colorado River Fishery Project. U.S. Bureau of Reclamation, Salt Lake City, Utah.
- Vanicek, C. D. 1967. Ecological studies of native Green River fishes below Flaming Gorge dam, 1964-1966. Ph.D. Dissertation. Utah State University, Logan, Utah. 124 pp.
- Wolz, E. R., and D. K. Shiozawa. 1995. Soft sediment benthic macroinvertebrate communities of the Green River at the Ouray National Wildlife Refuge, Uintah County, Utah. Great Basin Naturalist 55:213-224.
- Wydoski, R. S. and E. J. Wick. 1998. Ecological Value of Flooplain Habitats to Razorback Suckers in the Upper Colorado River Basin. Upper Colorado River Basin Recovery Program, Denver, Colorado.

California condor

- California Condor Reintroduction Program. 2002. A review of the first five years of the California Condor Reintroduction Program in Northern Arizona. February 14, 2002. Prepared by the Arizona Condor Review Team for the California Condor Recovery Team and U.S. Fish and Wildlife Service, California/Nevada Operations Office, Sacramento, California.
- Cooper, J.G. 1890. A doomed bird. Zoe 1:248-249.
- Koford, C.B. 1953. The California condor. National Audubon Society Research Report 4:1-154.
- National Park Service. 2005. Three Condors to be Released October 4: California condor (*Gymnogyps californianus*) <http://www.nps.gov/grca/media/2003/2-29sep03.htm>.
- San Diego Zoo. 2005. Birds: California condor. <http://www.sandiegozoo.org/animalbytes/t-condor.html>.
- Schmitt, N.J. 1995. In Prep. A study of the California condor molt.

Snyder, N.F.R., E.V. Johnson, and D.A. Clendenen. 1987. Primary molt of California condors. *Condor* 89:468-485.

U.S. Fish and Wildlife Service. 1996. California condor recovery plan, third revision. Portland, Oregon. 62 pp.

Wilbur, S.R. 1978. The California condor, 1966-76: a look at its past and future. U.S. Fish and Wildlife Service, *North America Fauna* 72:1-136.

Western-yellow billed cuckoo

Johnson, M.J., A. Brand, H.C. English, C. Michaud, and B. Moore. 1999. Southwestern willow catcher and Western yellow-billed cuckoo surveys along the Colorado River (Dewey Bridge—Canyonlands National Park Northern Boundary) and Green River, Utah—Canyonlands National Park boundary) 1999. U.S. Geological Survey report to the U.S. Bureau of Reclamation and the Utah Division of Natural Resources.

Kauffman, K. 1996. *Lives of North American Birds*. Houghton Mifflin Company. New York, NY

U.S. Fish and Wildlife The Service. 2001. Endangered and Threatened Wildlife and Plants; 12-Month Finding for a Petition To List the Yellow-billed Cuckoo (*Coccyzus americanus*) in the Western Continental United States. *Fed Reg.* 66 (143): 38611-38626.

APPENDIX A

As part of the Proposed Plan, the BLM has included conservation measures to minimize or eliminate adverse impacts to federally listed species. The species with potential to inhabit the Monticello planning area are: Mexican Spotted Owl, Southwestern Willow Flycatcher, California condor, and the four listed Colorado River fishes.

Mexican Spotted Owl (*Strix occidentalis lucida*) Conservation Measures

The following list of measures provides species-specific guidance, intended to avoid, minimize, or reduce potential adverse impacts from implementation of BLM actions under the authority of current Utah BLM LUPs on the Mexican spotted owl (*Strix occidentalis lucida*). This list is not comprehensive. Additional conservation measures, or other modified versions of these measures, may be applied for any given BLM-authorized activity upon further analysis, review, coordination efforts, and/or appropriate levels of section 7 consultation with the Service.

BLM will place restrictions on all authorized (permitted) activities that may adversely affect the Mexican spotted owl in identified PACs, breeding habitat, or designated critical habitat, to reduce the potential for adverse impacts to the species. Restrictions and procedures have been adapted from guidance published in the Utah Field Office Guidelines for Raptor Protection from Human and Land-use Disturbances (USFWS 2002b), as well as coordination between BLM and the Service. Measures include:

Surveys, according to USFWS protocol, will be required prior to any disturbance related activities that have been identified to have the potential to impact Mexican spotted owl, unless current species occupancy and distribution information is complete and available. All surveys must be conducted by USFWS certified individuals, and approved by the BLM authorized officer.

Assess habitat suitability for both nesting and foraging using accepted habitat models in conjunction with field reviews. Apply the appropriate conservation measures below if project activities occur within 0.5 mile of suitable owl habitat, dependent in part on if the action is temporary¹ or permanent²:

For all temporary actions that may impact owls or suitable habitat:

- If action occurs entirely outside of the owl breeding season, and leaves no permanent structure or permanent habitat disturbance, action can proceed without an occupancy survey.
- If action will occur during a breeding season, survey for owls prior to commencing activity. If owls are found, activity should be delayed until outside of the breeding season.

¹ Temporary activities are defined as those that are completed prior to the start of the following raptor breeding season, leaving no permanent structures and resulting in no permanent habitat loss.

² Permanent activities continue for more than one breeding season and/or cause a loss of owl habitat or displaces owls through disturbances, e.g., creation of a permanent structure including but not limited to well pads, roads, pipelines, electrical power line.

- Eliminate access routes created by a project through such means as raking out scars, revegetation, gating access points, etc.

For all permanent actions that may impact owls or suitable habitat:

- Survey two consecutive years for owls according to established protocol prior to commencing of activity.
 - If owls are found, no actions will occur within 0.5 mile of identified nest site.
 - If nest site is unknown, no activity will occur within the designated Protected Activity Center (PAC).
 - Avoid placing permanent structures within 0.5 mi of suitable habitat unless surveyed and not occupied.
 - Reduce noise emissions (e.g., use hospital-grade mufflers) to 45 dBA at 0.5 mile from suitable habitat, including canyon rims (Delaney et al. 1997). Placement of permanent noise-generating facilities should be determined by a noise analysis to ensure noise does not encroach upon a 0.5 mile buffer for suitable habitat, including canyon rims.
 - Limit disturbances to and within suitable owl habitat by staying on designated routes.
 - Limit new access routes created by the project.
1. BLM will, as a condition of approval (COA) on any project proposed within identified PACs, designated critical habitat, or within spatial buffers for Mexican spotted owl nests (0.5 mile), ensure that project proponents are notified as to their responsibilities for rehabilitation of temporary access routes and other temporary surface disturbances, created by their project, according to individual BLM Field Office standards and procedures, or those determined in the project-specific Section 7 Consultation.
 2. BLM will require monitoring of activities in designated critical habitat, identified PACs, or breeding habitats, wherein it has been determined that there is a potential for take. If any adverse impacts are observed to occur in a manner, or to an extent that was not considered in the project-specific Section 7 Consultation, then consultation must be reinitiated.
 - Monitoring results should document what, if any, impacts to individuals or habitat occur during project construction/implementation. In addition, monitoring should document successes or failures of any impact minimization, or mitigation measures. Monitoring results would be considered an opportunity for adaptive management, and as such, would be carried forward in the design and implementation of future projects.
 3. For all survey and monitoring actions:
 - Reports must be provided to affected field offices within 15 days of completion of survey or monitoring efforts.
 - Report any detection of Mexican spotted owls during survey or monitoring to the authorized officer within 48 hours.
 4. BLM will, in areas of designated critical habitat, ensure that any physical or biological factors (i.e., the primary constituent elements), as identified in determining and

designating such habitat, remains intact during implementation of any BLM-authorized activity.

5. For all BLM actions that “*may adversely affect*” the primary constituent elements in any suitable Mexican spotted owl habitat, BLM will implement measures as appropriate to minimize habitat loss or fragmentation, including rehabilitation of access routes created by the project through such means as raking out scars, revegetation, gating access points, etc.
6. Where technically and economically feasible, use directional drilling from single drilling pads to reduce surface disturbance, and minimize or eliminate need to drilling in canyon habitats suitable for Mexican spotted owl nesting.
7. Prior to surface-disturbing activities in Mexican spotted owl PACs, breeding habitats, or designated critical habitat, specific principles should be considered to control erosion. These principles include:
 - Conduct long-range transportation planning for large areas to ensure that roads will serve future needs. This will result in less total surface disturbance.
 - Avoid surface disturbance in areas with high erosion hazards to the greatest extent possible. Avoid mid-slope locations, headwalls at the source of tributary drainages, inner valley gorges, and excessively wet slopes such as those near springs. In addition, avoid areas where large cuts and fills would be required.
 - Locate roads to minimize roadway drainage areas and to avoid modifying the natural drainage areas of small streams.
8. Project developments should be designed, and located to avoid direct or indirect loss or modification of Mexican spotted owl nesting and/or identified roosting habitats.
9. Water production associated with BLM authorized actions should be managed to ensure maintenance or enhancement of riparian habitats.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*) Conservation Measures

The following list of measures provides species-specific guidance intended to avoid, minimize, or reduce potential adverse impacts from implementation of BLM actions under the authority of current Utah BLM LUPs on the Southwestern willow flycatcher (*Empidonax traillii extimus*). This list is not comprehensive. Additional conservation measures, or other modified versions of these measures, may be applied for any given BLM-authorized activity upon further analysis, review, coordination efforts, and/or appropriate levels of section 7 consultation with the USFWS.

1. Surveys will be required prior to operations that “*may adversely affect*” the Southwestern willow flycatcher unless species occupancy data and distribution information is complete and available. Surveys will only be conducted by BLM-approved personnel. In the event species occurrence is verified, project proponents may be required to modify operational plans at the discretion of the authorized officer. Modifications may include appropriate measures for minimization of adverse effects to the Southwestern willow flycatcher and its habitat.

2. BLM will monitor and restrict, when and where necessary, authorized or casual use activities that “*may adversely affect*” the Southwestern willow flycatcher, including but not limited to, recreation, mining, and oil and gas activities. Monitoring results should be considered in the design and implementation of future projects.
3. To monitor the impacts of BLM-authorized projects determined “*likely to adversely affect*” the Southwestern willow flycatcher, BLM should prepare a short report describing progress, including success of implementation of all associated mitigation. Reports shall be submitted annually to the USFWS Utah Field Office by March 1st beginning one full year from date of implementation of the proposed action. BLM should avoid granting activity permits or authorizing development actions in Southwestern willow flycatcher habitat. Unoccupied potential habitat should be protected in order to preserve them for future management actions associated with the recovery of the Southwestern willow flycatcher.
4. BLM will ensure project design incorporates measures to avoid direct disturbance to populations and suitable habitats where possible. At a minimum, project designs should include consideration of water flows, slope, seasonal and spatial buffers, possible fencing, and pre-activity flagging of critical areas for avoidance.
5. The BLM will continue to address illegal and unauthorized OHV use and activity upon BLM administered lands. In order to protect, conserve, and recover the Southwestern willow flycatcher in areas of heavy unauthorized use, temporary closures, or use restrictions beyond those which are already in place, may be imposed. As funding allows, BLM should complete a comprehensive assessment of all OHV use areas that interface with Southwestern willow flycatcher populations. Comparison of Southwestern willow flycatcher populations and OHV use areas using GIS would give BLM personnel another tool to manage and/or minimize impacts.
6. All surface-disturbing activities should be restricted within a 0.25 mile buffer from suitable riparian habitats and permanent surface disturbances should be avoided within 0.5 mile of suitable Southwestern willow flycatcher habitat.
 - Unavoidable ground disturbing activities in occupied Southwestern willow flycatcher habitat should only be conducted when preceded by current year survey, should only occur between August 16 and April 30 (the period when Southwestern willow flycatcher are not likely to be breeding), and should be monitored to ensure that adverse impacts to Southwestern willow flycatcher are minimized or avoided, and to document the success of project specific mitigation/protection measures. As monitoring is relatively undefined, project specific requirements must be identified.
7. BLM will properly consider nesting periods for Southwestern willow flycatcher when conducting horse gathering operations in the vicinity of habitat.
8. BLM will ensure that plans for water extraction and disposal are designed to avoid changes in the hydrologic regime that would likely result in loss or undue degradation of riparian habitat.

9. Native species will be preferred over non-native for revegetation of habitat in disturbed areas.
10. BLM will coordinate with other agencies and private landowners to identify voluntary opportunities to modify current land stewardship practices that may impact the Southwestern willow flycatcher and its habitats.
11. Limit disturbances to within suitable habitat by staying on designated routes.
12. Ground-disturbing activities will require monitoring throughout the duration of the project to ensure that adverse impacts to Southwestern willow flycatcher are avoided. Monitoring results should document what, if any, impacts to individuals or habitat occur during project construction/implementation. In addition, monitoring should document successes or failures of any impact minimization or mitigation measures. Monitoring results would be considered an opportunity for adaptive management and, as such, would be carried forward in the design and implementation of future projects.
13. Where technically and economically feasible, use directional drilling or multiple wells from the same pad to reduce surface disturbance and eliminate drilling in Southwestern willow flycatcher habitat.
14. Habitat disturbances (i.e., organized recreational activities requiring special use permits, drilling activities, etc.) will be avoided within 0.25 mile of suitable Southwestern willow flycatcher habitat from May 1 to August 15.
15. Grazing allotments that contain habitat for the species will be managed with consideration for recommendations provided by the Southwestern Willow Flycatcher Recovery Plan, and other applicable research.

Colorado River Endangered Fishes Conservation Measures

Bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), Humpback chub (*Gila cypha*), and Razorback sucker (*Xyrauchen texanus*)

The following list of measures provides species-specific guidance intended to avoid, minimize, or reduce potential adverse impacts from implementation of BLM actions under the authority of current Utah BLM LUPs on the Colorado pikeminnow, Humpback chub, bonytail, and razorback sucker, herein referred to as the Colorado River fishes. This list is not comprehensive. Additional conservation measures, or other modified versions of these measures, may be applied for any given BLM-authorized activity upon further analysis, review, coordination efforts, and/or appropriate levels of section 7 consultation with the USFWS.

1. Monitoring of impacts of site-specific projects authorized by the BLM will result in the preparation of a report describing the progress of each site-specific project, including implementation of any associated reasonable and prudent measures or reasonable and prudent alternatives. This will be a requirement of project proponents and will be included as a condition of approval (COA) on future proposed actions that have been determined to have the potential for take. Reports will be submitted annually to the USFWS - Utah Field Office, beginning after the first full year of implementation of the project, and shall list and describe:

- Any unforeseen direct or indirect adverse impacts that result from activities of each site-specific project;
 - Estimated levels of impact or water depletion, in relation to those described in the original project-level Consultation effort, in order to inform the Service of any intentions to reinstate Section 7 Consultation; and
 - Results of annual, periodic monitoring which evaluates the effectiveness of any site-specific terms and conditions that are part of the formal Consultation process. This will include items such as an assessment of whether implementation of each site-specific project is consistent with that described in the BA, and whether the project has complied with terms and conditions.
2. The BLM shall notify the USFWS immediately of any unforeseen impacts detected during project implementation. Any implementation action that may be contributing to the introduction of toxic materials or other causes of fish mortality must be immediately stopped until the situation is remedied. If investigative monitoring efforts demonstrate that the source of fish mortality is not related to the authorized activity, the action may proceed only after notification of USFWS authorities.
 3. Unoccupied, suitable habitat areas should be protected in order to preserve them for future management actions associated with the recovery of the Endangered Colorado River Fish, as well as approved reintroduction, or relocation efforts.
 - BLM will avoid impacts where feasible, to habitats considered most representative of prime suitable habitat for these species.
 - Surface-disturbing activities will be restricted within ¼ mile of the channel centerline of the Colorado, Green, Duchesne, Price, White, and San Rafael Rivers
 - Surface-disturbing activities proposed to occur within floodplains or riparian areas will be avoided unless there is no practical alternative or the development would enhance riparian/aquatic values. If activities must occur in these areas, construction will be designed to include mitigation efforts to maintain, restore, and/or improve riparian and aquatic conditions. If conditions could not be maintained, offsite mitigation strategies should be considered.
 4. BLM will ensure project proponents are aware that designs must avoid as much direct disturbance to current populations and known habitats as is feasible. Designs should include:
 - protections against toxic spills into rivers and floodplains;
 - plans for sedimentation reduction;
 - minimization of riparian vegetation loss or degradation;
 - pre-activity flagging of critical areas for avoidance;
 - design of stream-crossings for adequate passage of fish; and
 - measures to avoid or minimize impacts on water quality at the 25-year frequency runoff
 5. Prior to surface-disturbing activities, specific principles will be considered to control erosion. These principles include:

- Conduct long-range transportation planning for large areas to ensure that roads will serve future needs. This will result in less total surface disturbance.
 - Avoid, where possible, surface disturbance in areas with high erosion hazards.
 - Avoid mid-slope location of drill pads, headwalls at the source of tributary drainages, inner valley gorges, excessively wet slopes such as those near springs and avoid areas where large cuts and fills would be required.
 - Design and locate roads to minimize roadway drainage areas and to avoid modifying the natural drainage areas of small streams.
6. Where technically and economically feasible, project proponents will use directional drilling or multiple wells from a single pad to reduce surface disturbance and eliminate drilling in suitable riparian habitat. Ensure that such drilling does not intercept or degrade alluvial aquifers. Drilling will not occur within 100 year floodplains that contain listed fish species or their designated critical habitats.
 7. The Utah Oil and Gas Pipeline Crossing Guidance (BLM National Science and Technology Center), or other applicable guidance, will be implemented for oil and gas pipeline river/stream crossings.
 8. In areas adjacent to 100-year floodplains, particularly in systems prone to flash floods, BLM will analyze the risk for flash floods to impact facilities. Potential techniques may include the use of closed loop drilling and pipeline burial or suspension as necessary to minimize the potential for equipment damage and resultant leaks or spills.
 9. Water depletions from any portion of the Upper Colorado River drainage basin above Lake Powell are considered to adversely affect and adversely modify the critical habitat of these endangered fish species. Section 7 consultation will be completed with the Service prior to any such water depletions.
 10. Design stream-crossings for adequate passage of fish (if present), minimum impact on water quality, and at a minimum, a 25-year frequency run-off.

Resource Protection Measures Incorporated from the Utah Land-use Plan Amendment for Fire and Fuels Management (UT-USO-04-01)

1. Initiate emergency Section 7 consultation with U.S. Fish and Wildlife Service upon the determination that wildfire suppression may pose a potential threat to any listed threatened or endangered species or adverse modification of designated critical habitat.
2. Prior to planned fire management actions, survey for listed threatened and endangered and non-listed sensitive species. Initiate Section 7 consultation with U.S. Fish and Wildlife Service as necessary if proposed project may affect any listed species. Review appropriate management, conservation and recovery plans and include recovery plan direction into project proposals. For non-listed special status plant and animal species, follow the direction contained in the BLM 6840 Manual. Ensure that any proposed project conserves non-listed sensitive species and their habitats and ensure that any action authorized, funded or carried out by the BLM does not contribute to the need for any species to become listed.

3. Follow Terms and Conditions identified in the Biological Opinion accompanying the Utah Land-use Plan Amendment for Fire and Fuels Management

Conservation Measures from the Biological Opinion for the Utah BLM Land Use Plans (LUP) Amendments BA and Fire Management Plans (FMP) BAs

Firefighter and public safety is the first priority in every fire management activity. Setting priorities among protecting human communities, community infrastructure, other property and improvements, and natural and cultural resources must be based on the values to be protected, human health and safety, and costs of protection. The Applicant Committed Resource Protection Measures will apply to the species covered in this consultation, unless a threat to human life or property exists.

During the wildfire suppression activities, the Incident Commander has the final decision-making authority for suppression operations and tactics, including implementation of resource protection operations, thereby minimizing or avoiding many effects to federally protected species. However, in the event that measures cannot be implemented during fire suppression operations due to safety concerns, some effects may occur to federally protected species. In these cases, BLM would initiate emergency consultation with the Service for these fire suppression efforts.

Land Use Plan Amendment

The project proponent commits to the following resource protection measures as identified in the March 4, 2005 Biological Assessment. These measures have been developed as part of the proposed action to provide statewide consistency in reducing the effects of fire management activities on listed, proposed, and candidate species and their habitats. Resource protection measures for fire management practices use the following codes to represent which actions ~~fir~~ within each of the measures:

SUP: wildland fire suppression,
WFU: wildland fire use for resource benefit,
RX: prescribed fire,
NF: non-fire fuel treatments,
ESR: Emergency Stabilization and Rehabilitation

Measures designed to protect air quality include:

- A-1 Evaluate weather conditions, including wind speed and atmospheric stability, to predict impacts from smoke from prescribed fires and wildland fire uses. Coordinate with Utah Department of Environmental Quality for prescribed fires and wildland fire use (RX, WFU).
- A-2 When using chemical fuels reduction methods, follow all label requirements for herbicide application (NF).

Measures designed to protect soil and water quality include:

- SW-1 Avoid heavy equipment use on highly erosive soils (soils with low soil loss tolerance), wet or boggy soils and slopes greater than 30%, unless otherwise analyzed and allowed under appropriate NEPA evaluation with implementation of additional erosion control and other soil protection mitigation measures. (SUP, WFU, RX, NF, ESR)
- SW-2 There may be situations where high intensity fire will occur on sensitive and erosive soil types during wildland fire, wildland fire use or prescribed fire. If significant areas show evidence of high severity fire, then evaluate area for soil erosion potential and downstream values at risk and implement appropriate or necessary soil stabilization actions such as mulching or seeding to avoid excessive wind and water erosion. (SUP, WFU, RX)
- SW-3 Complete necessary rehabilitation on fire lines or other areas of direct soil disturbance, including but not limited to water barring fire lines, covering and mulching fire lines with slash, tilling and/or sub soiling compacted areas, scarification of vehicle tracks, OHV closures, seeding and/or mulching for erosion protection. (SUP, WFU, RX)
- SW-4 When using mechanical fuels reduction treatments, limit tractor and heavy equipment use to periods of low soil moisture to reduce the risk of soil compaction. If this is not practical, evaluate sites, post treatment and if necessary, implement appropriate remediation, such as sub soiling, as part of the operation. (NF)
- SW-5 Treatments such as chaining, plowing and roller chopping shall be conducted as much as practical on the contour to reduce soil erosion. (NF, ESR)
- SW-6 When using chemical fuel reduction treatments follow all label directions, additional mitigations identified in project NEPA evaluation and the Approved Pesticide Use Permit. At a minimum, provide a 100-foot-wide riparian buffer strip for aerial application, 25 feet for vehicle application and 10 feet for hand application. Any deviations must be accordance with the label. Herbicides would be applied to individual plants within 10 feet of water where application is critical. (NF)
- SW-7 Avoid heavy equipment in riparian or wetland areas. During fire suppression or wildland fire use, consult a Resource Advisor before using heavy equipment in riparian or wetland areas. (SUP, WFU, RX, NF, ESR)
- SW-8 Limit ignition within native riparian or wetland areas. Allow low-intensity fire to burn into riparian areas. (RX)
- SW-9 Suppress wildfires consistently with compliance strategies for restoring or maintaining the restoration of water quality impaired [303(d) listed] water bodies. Do not use retardant within 300 feet of water bodies. (SUP, WFU)
- SW-10 Plan and implement projects consistent with compliance strategies for restoring or maintaining the restoration of water quality impaired [303(d) listed] water bodies. Planned activities should take into account the potential impacts on water quality, including increased water yields that can threaten fisheries and aquatic habitat; improvements at channel crossings; channel stability; and downstream values. Of

special concern are small headwaters of moderate to steep watersheds, erosive or saline soils; multiple channel crossings; at-risk fisheries, and downstream residents. (RX, NF, ESR)

Measures designed to protect vegetation include:

- V-1 When restoring or rehabilitating disturbed rangelands, non-intrusive, non-native plant species are appropriate for use when native species: (1) are not available; (2) are not economically feasible; (3) cannot achieve ecological objectives as well as non-native species; and/or (4) cannot compete with already established native species. (RX, NF, ESR)
- V-2 In areas known to have weed infestations, aggressive action should be taken in rehabilitating fire lines, seeding and follow-up monitoring and treatment to reduce the spread of noxious weeds. Monitor burned areas and treat as necessary. All seed used would be tested for purity and for noxious weeds. Seed with noxious weeds would be rejected. (SUP, WFU, RX, NF, ESR)

Measures designed to protect special status species (including threatened and endangered species) include:

- SSS-1 Initiate emergency Section 7 consultation with United States Fish and Wildlife Service (Service) upon the determination that wildfire suppression may pose a potential threat to any listed threatened or endangered species or adverse modification of designated critical habitat. (SUP)
- SSS-2 Prior to planned fire management actions, survey for listed threatened, endangered, and non-listed sensitive species. Initiate Section 7 consultation with the Service as necessary if a proposed project may affect any listed species. Review appropriate management, conservation and recovery plans and include recovery plan direction into project proposals. For non-listed special status plant and animal species, follow the direction contained in the BLM 6840 Manual. Ensure that any proposed project conserves non-listed sensitive species and their habitats and ensure that any action authorized, funded, or carried out by BLM does not contribute to the need for any species to become listed. (RX, NF, ESR)
- SSS-3 Incorporate site-specific conservation measures identified in this BA. (SUP, WFU, RX, NF, ESR)

Measures designed to protect fish and wildlife resources include:

- FW-1 Avoid treatments during nesting, fawning, spawning, or other critical periods for wildlife or fish. (RX, NF, ESR)
- FW-2 Avoid if possible or limit the size of, wildland fires in important wildlife habitats such as, mule deer winter range, riparian and occupied sage grouse habitat. Use Resource Advisors to help prioritize resources and develop Wildland Fire Situation Analyses (WFSAs) and Wildland Fire Implementation Analyses (WFSAs) and Wildland Fire Implementation Plans (WFIPs) when important habitats may be impacted. (SUP, WFU)

- FW-3 Minimize wildfire size and frequency in sagebrush communities where sage grouse habitat objectives will not be met if a fire occurs. Prioritize wildfire suppression in sagebrush habitat with an understory of invasive, annual species. Retain unburned islands and patches of sagebrush unless there are compelling safety, private property and resource protection or control objectives at risk. Minimize burn out operations (to minimize burned acres) in occupied sage-grouse habitats when there are not threats to human life and/or important resources. (SUP)
- FW-4 Establish fuel treatment projects at strategic locations to minimize size of wildfires and to limit further loss of sagebrush. Fuel treatments may include green stripping to help reduce the spread of wildfires into sagebrush communities. (RX, NF)
- FW-5 Use wildland fire to meet wildlife objectives. Evaluate impacts to sage grouse habitat in areas where wildland fire use for resource benefit may be implemented. (WFU, RX)
- FW-6 Create small openings in continuous or dense sagebrush (>30% canopy cover) to create a mosaic of multiple-age classes and associated understory diversity across the landscape to benefit sagebrush-dependent species. (WFU, RX, NF)
- FW-7 On sites that are currently occupied by forests or woodlands, but historically supported sagebrush communities, implement treatments (fire, cutting, chaining, seeding, etc.) to re-establish sagebrush communities. (RX, NF)
- FW-8 Evaluate and monitor burned areas and continue management restrictions until the recovering and/or seeded plant community reflect the desired condition. (SUP, WFU, RX, ESR)
- FW-9 Utilize the Emergency Stabilization and Rehabilitation program to apply appropriate post fire treatments within crucial wildlife habitats, including sage grouse habitats. Minimize seeding with non-native species that may create a continuous perennial grass cover and restrict establishment of native vegetation. Seed mixtures should be designed to re-establish important seasonal habitat components for sage grouse. Leks should not be re-seeded with plants that change the vegetation heights previously found on the lek. Forbs should be stressed in early and late brood-rearing habitats. In situations of limited funds for emergency stabilization and rehabilitation actions, prioritize rehabilitation of sage grouse habitats. (ESR)

Measures designed to protect wild horses and burros include:

- WHB-1 Avoid fencing that would restrict access to water. (RX, NF, ESR)

Measures designed to protect cultural resources include:

- CR-1 Cultural Resource Advisors should be contacted when fires occur in areas containing sensitive cultural resources. (SUP)
- CR-2 Wildland fire use is discouraged in areas containing sensitive cultural resources. A Programmatic Agreement is being prepared between the Utah State Historic Preservation Office, BLM, and the Advisory Council to cover the finding of adverse effects to cultural resources associated with wildland fire use. (WFU)

CR-3 Potential impacts of proposed treatments should be evaluated for compliance with the National Historic Preservation Act (NHPA) and the Utah Statewide Protocol. This should be conducted prior to the proposed treatment. (RX, NF, ESR)

Measures designed to protect paleontology resources include:

- P-1 Planned projects should be consistent with BLM Manual and Handbook H-8270-1, Chapter III (A) and III (B) to avoid areas where significant fossils are known or predicted to occur or to provide for other mitigation of possible adverse effects. (RX, NF, ESR)
- P-2 In the event that paleontological resources are discovered in the course of surface fire management activities, including fires suppression, efforts should be made to protect these resources. (SUP, WFU, RX, NF, ESR)

Measures designed to protect forestry resources include:

- F-1 Planned projects should be consistent with HFRA Section 102(e)(2) to maintain or contribute to the restoration of old-growth stands to a pre-fire suppression condition and to retain large trees contributing to old-growth structure. (SUP, WFU, RX, NF)
- F-2 During planning, evaluate opportunities to utilize forest and woodland products prior to implementing prescribed fire activities. Include opportunities to use forest and woodland stands, consider developing silvicultural prescriptions concurrently with fuel treatments prescriptions. (RX, NF)

Measures designed to protect livestock grazing resources include:

- LG-1 Coordinate with permittees regarding the requirements for non-use or rest of treated areas. (SUP, WFU, RX, NF, ESR)
- LG-2 Rangelands that have been burned by wildfire, prescribed fire, or wildland fire use, would be ungrazed for a minimum of one complete growing season following the burn. (SUP, WFU, RX)
- LG-3 Rangelands that have been re-seeded or otherwise treated to alter vegetation composition, chemically or mechanically, would be ungrazed for a minimum of two complete growing seasons. (RX, NF, ESR)

Measures designed to protect recreation and visitor services include:

- Rec-1 Wildland fire suppression efforts would preferentially protect Special Recreation Management Areas and recreation site infrastructure in line with fire management goals and objectives. (SUP)
- Rec-2 Vehicle tracks created off of established routes would be obliterated after fire management actions in order to reduce unauthorized OHV travel. (SUP, WFU, RX, NF, ESR)

Measures designed to protect land and reality resources include:

- LR-1 Fire management practices would be designed to avoid or otherwise ensure the protection of authorized rights-of-way and other facilities located on the public lands, including coordination with holders of major rights-of-way systems within rights-of-way corridors and communication sites. (WFU, RX, NF, ESR)
- LR-2 Fire management actions must not destroy, deface, change or remove to another place any monument or witness tree of the Public Land Survey System. (SUP, WFU, RX, NF, ESR)

Measures designed to minimize impacts confounded by hazardous waste include:

- HW-1 Recognize hazardous wastes and move fire personnel to a safe distance from dumped chemicals, unexploded ordnance, drug labs, wire burn sites, or any other hazardous wastes. Immediately notify BLM Field Office hazmat coordinator or state hazmat coordinator upon discovery of any hazardous materials, following the BLM hazardous materials contingency plan. (SUP, WFU, RX, NF, ESR)

Measures designed to protect mineral resources include:

- M-1 A safety buffer should be maintained between fire management activities and at-risk facilities. (SUP, WFU, RX)

Measures designed to protect wilderness and wilderness study areas (WSAs) include:

- Wild-1 The use of earth-moving equipment must be authorized by the field office manager. (SUP, WFU, RX, ESR)
- Wild-2 Fire management actions would rely on the most effective methods of suppression that are least damaging to wilderness values, other resources and the environment, while requiring the least expenditure of public funds. (SUP, WFU)
- Wild-3 A Resource Advisor should be consulted when fire occurs in Wilderness and WSAs. (SUP, WFU)

Additional Resource Protection Measures

In addition to the resource protection measures listed in the LUP Amendment and five FMPs, the following conservation measures were developed through the Section 7 (of the ESA) consultation process. The BLM has incorporated these measures into the six Proposed Actions by reference to their BA, and include:

- Manage natural and prescribed Fire Regimes to protect or improve Utah prairie dog habitat.
- Within Utah prairie dog habitat, reseeding would be implemented according to the Utah Prairie Dog Recovery Plan.
- Manage prescribed fire and wildland fire use within Mexican spotted owl Protected Activity Centers (PACs) to ensure protection of nesting, roosting, and foraging habitats.

- Wildland fire suppression would be prioritized for use in Mexican spotted owl PACs. When feasible, fire camps associated with suppression efforts would be built outside of the PACs and nest protection areas.
- For treatments within suitable habitat for listed species, pre- and post-monitoring would take place as determined on a case-by-case basis.
- Incorporate the standards and guidelines recommended by the Inland Native Fish Strategy (USFS 1995)
- As per the decision of the Resource Advisor, avoid construction of fire lines using mechanized equipment across the stream channel. If used, the mechanized equipment would terminate at, and not cross, the stream channel.
- Avoid transferring water from one watershed into another for the purpose of water drops, as this could aid in the spread of water-borne diseases such as whirling disease.
- Avoid retardant use in any riparian/wetland communities.
- Restrict use of mechanical treatments and hand tools.
- Per-burn acreage limitations of 5-100 acres, as long as human life or property are not threatened.
- If the white-tailed prairie dog is listed, initiate emergency Section 7 consultation with the Service upon the determination that wildland fire suppression may pose a potential threat to the species. (SUP)

Prior to planned fire management actions, survey for listed threatened and endangered and non-listed sensitive species. Initiate Section 7 consultation with the Service as necessary if proposed projects may impact the white-tailed prairie dog, if listed. Review appropriate management, conservation, and recovery plans and include recovery plan direction into project proposals, if listed. Until the white-tailed prairie dog is listed, follow the direction contained in the BLM 6840 Manual. Ensure that any proposed project conserves non-listed sensitive species and their habitats and ensure that any action, authorized, funded or carried out by BLM does not contribute to the need for any species to become listed.

Measure Specific to the Moab Fire Region (Moab, Price, and Monticello Field Offices)

Restoration and rehabilitation measures may follow prescribed and non-fire management actions. They would emphasize the re-establishment and perpetuation of habitat diversity and prevention of reduction of invasive weeds species. The short-term objective would be to stabilize soils, reduce potential impacts to values at risk (cultural, watershed, fish and wildlife, and any adjacent private holdings), and prevent the establishment of non-native invasive species. Long-term objectives include further stabilization of sites to assist in the re-establishment of the native vegetation community that existed prior to the disturbance. Restoration and rehabilitation efforts are selectively applied to planned management actions. Emergency stabilization and rehabilitation is a part of wildland fire suppression action and is considered separately from standard restoration and rehabilitation.

Stipulations and Environmental Best Practices Applicable to Oil and Gas Leasing and Other Surface-disturbing Activities

Stipulations Applicable to Oil and Gas Leasing and Other Surface-disturbing Activities

This appendix lists by alternative the stipulations for oil and gas leasing referred to throughout the Biological Assessment. These stipulations would also apply, where appropriate and practical, to other surface-disturbing activities (and occupancy) associated with land-use authorizations, permits, and leases issued on BLM lands. The stipulations would not apply to activities and uses where they are contrary to laws, regulations, or specific program guidance. The intent is to maintain consistency, to the extent possible, in applying stipulations to all surface-disturbing activities.

Surface-disturbing activities are those that normally result in more than negligible disturbance to public lands and accelerate the natural erosive process. Surface disturbance may, but does not always, require reclamation. These activities normally involve use and/or occupancy of the surface, cause disturbance to soils and vegetation, and are usually caused by motorized or mechanical actions. They include, but are not limited to: the use of mechanized earth-moving equipment; truck-mounted drilling and geophysical exploration equipment; off-road vehicle travel in areas designated as limited or closed to off-road vehicle use; vegetation treatments; construction of facilities such as power lines, pipelines, oil and gas wells; recreation sites, improvements for range and wildlife; new road construction; and use of pyrotechnics and explosives. Surface disturbance is not normally caused by casual-use activities. Activities that are not considered surface-disturbing include, but are not limited to: livestock grazing, cross-country hiking, minimum impact filming, and vehicular travel on designated routes.

Description of Stipulations

The following tables show resources of concern and stipulations including exceptions, modifications, and waivers by alternative. Three types of stipulations could be applied to land-use authorizations: 1) no surface occupancy (NSO), 2) timing limitations (TL), and 3) controlled surface use (CSU). Although not a stipulation, areas that are closed to oil and gas leasing and other surface-disturbing activities are also identified in the tables. All other areas are open to oil and gas leasing subject to standard terms and conditions.

Areas identified as NSO are open to oil and gas leasing but surface-disturbing activities cannot be conducted on the surface of the land. Access to oil and gas deposits would require horizontal drilling from outside the boundaries of the NSO areas. NSO areas are avoidance areas for rights-of-way; no rights-of-ways would be granted in NSO areas unless there are no feasible alternatives. Where necessary in the future, NSO areas could be recommended for withdrawal from operations conducted under the mining laws (locatable minerals) if unacceptable resource impacts are occurring or could occur. A NSO stipulation cannot be applied to operations conducted under the mining laws without a withdrawal. A withdrawal is not a land-use planning decision because it must be approved by the Secretary of Interior. Therefore, unless withdrawn, areas identified as NSO are open to operations conducted under the mining laws subject only to TL and CSU stipulations, which are consistent with the rights granted under the mining laws.

Areas identified as TL are open to oil and gas leasing but would be closed to surface-disturbing activities during identified time frames. This stipulation would not apply to operation and maintenance activities, including associated vehicle travel, unless otherwise specified.

Areas identified as CSU are open to oil and gas leasing but would require proposals for surface-disturbing activities to be authorized only according to the controls or constraints specified.

Areas identified as closed are not open to oil and gas leasing. Exceptions, modifications, and waivers do not apply to closed areas. Closed areas are exclusion areas for rights-of-way. WSAs and wilderness areas are closed to oil and gas leasing by the regulations found at 43 CFR 3100.0-3(a)(2)viii and xi. Also, areas identified with wilderness characteristics are closed in Alternative B. Other areas are partially closed to oil and gas leasing where it is not reasonable to apply a NSO stipulation across the entire area. This includes areas where the oil and gas resources are physically inaccessible by current directional drilling technology (1 mile) from outside the NSO area. These lands closed to oil and gas leasing are retained with a NSO stipulation for all other surface-disturbing activities and exceptions, modifications, and waivers apply to these activities. Closed areas identified with wilderness characteristics in Alternative B could be recommended for withdrawal of operations conducted under the mining laws. WSAs and wilderness areas are already protected from these activities by withdrawal or existing laws, regulations, and policies.

Exceptions, Modifications, and Waivers

Stipulations could be accepted, modified, or waived by the authorized officer. An exception exempts the holder of the land-use authorization document from the stipulation on a one-time basis. A modification changes the language or provisions of a surface stipulation, either temporarily or permanently. A waiver permanently exempts the surface stipulation. The environmental analysis document prepared for site specific proposals such as oil and gas development (i.e., APDs, sundry notices) also would need to address proposals to exempt, modify, or waive a surface stipulation.

Standard Terms and Conditions

All surface-disturbing activities are subject to standard terms and conditions. These include the restrictions that are required for proposed actions in order to protect special status species and to comply with the Endangered Species Act. Standard terms and conditions for oil and gas leasing provide for relocation of proposed operations up to 200 meters, and provide for prohibiting surface-disturbing operations for a period not exceeding 60 days.

The placement of production facilities on hilltops and ridgelines will be prohibited where they are highly visible.

Environmental Best Management Practices (BMP) For Oil and Gas Operations

Best Management Practices (BMP) are state-of-the-art mitigation measures applied on a site-specific basis to reduce, prevent, or avoid adverse environmental or social impacts. BMPs are applied to management actions to aid in achieving desired outcomes for safe, environmentally sound, resource development by preventing, minimizing, or mitigating adverse impacts and

reducing conflicts. For each proposed action, a number of BMPs may be applied as necessary to mitigate expected impacts. The following typical environmental BMPs will be applied on individual Applications for Permit to Drill and associated rights-of-way in the Monticello Field Office. These procedures are consistent with current national guidance and the Surface Operating Standards and Guidelines for Oil and Gas Development (Gold Book), 2007. This list is not comprehensive and may be modified over time as conditions change and new practices are identified.

- Interim reclamation of the well and access road will begin as soon as practicable after a well is placed in production. Facilities will be grouped on the pads to allow for maximum interim reclamation. Interim reclamation will include road cuts and fills and will extend to within close proximity of the wellhead and production facilities.
- All aboveground facilities including power boxes, building doors, roofs, and any visible equipment will be painted a color selected from the latest national color charts that best allows the facility to blend into the background.
- All new roads will be designed and constructed to a safe and appropriate standard, “no higher than necessary” to accommodate intended vehicular use. Roads will follow the contour of the land where practical. Existing oil and gas roads that are in eroded condition or contribute to other resource concerns will be brought to BLM standards within a reasonable period of time.
- Final reclamation of all oil and gas disturbance will involve re-contouring of all disturbed areas, including access roads, to the original contour or a contour that blends with the surrounding topography and revegetating all disturbed areas.
- Raptor perch avoidance devices will be installed on all new power lines and existing lines that present a potential hazard to raptors.
- All power lines to individual well locations (excluding major power source lines to the operating oil or gas field) and all flow lines will be buried in or immediately adjacent to the access roads.
- In developing oil and gas fields, all production facilities will be centralized to avoid tanks and associated facilities on each well pad.
- The use of submersible pumps will be strongly encouraged, especially in VRM Class I, II or III areas or any area visible by the visiting public.
- The use of partial or completely below-grade wellheads will be strongly encouraged in high visibility areas as well as VRM Class I, II or III areas.
- Multiple wells will be drilled from a single well pad wherever feasible.
- Noise reduction techniques and designs will be used to reduce noise from compressors or other motorized equipment.
- Seasonal restrictions on public vehicular access will be evaluated where there are wildlife conflict or road damage/maintenance issues.
- The placement of production facilities on hilltops and ridgelines will be prohibited where they are highly visible.

- Monitoring of wildlife will occur to evaluate the effects of oil and gas development.
- The placement of production facilities on hilltops and ridgelines will be avoided.
- Facilities will be screened from view.
- Oil field wastes and spills will be bio-remediated.
- Common utility or right-of-way corridors containing roads, power lines, and pipelines will be used.

Mexican Spotted Owl

In areas that contain suitable habitat for MSO or designated Critical Habitat, actions would be avoided or restricted that may cause stress and disturbance during nesting and rearing of their young. Appropriate measures would depend on whether the action is temporary or permanent and whether it occurs within or outside the owl nesting season. A temporary action is completed prior to the following breeding season leaving no permanent structures and resulting in no permanent habitat loss. A permanent action continues for more than one breeding season and/or causes a loss of owl habitat or displaces owls through disturbances, i.e., creation of a permanent structure. Current avoidance and minimization measures include the following:

- Surveys will be required prior to implementation of the proposed action. All surveys must be conducted by qualified individual(s) acceptable to the BLM.
- Assess habitat suitability for both nesting and foraging using accepted habitat models in conjunction with field reviews. Apply the conservation measures below if project activities occur within 0.5 mile of suitable owl habitat. Determine potential effects of actions to owls and their habitat.
- Document type of activity, acreage and location of direct habitat impacts, type and extent of indirect impacts relative to location of suitable owl habitat.
- Document if action is temporary or permanent.
- Activities may require monitoring throughout the duration of the project. To ensure desired results are being achieved, minimization measures will be evaluated, and, if necessary, Section 7 consultation reinitiated.
- Any activity that includes water production should be managed to ensure maintenance of enhancement of riparian habitat.
- Where technically and economically feasible, use directional drilling or multiple wells from the same pad to reduce surface disturbance and eliminate drilling in canyon habitat suitable for MSO nesting.

For all temporary actions that may impact owls or suitable habitat:

- a. If the action occurs entirely outside of the owl breeding season from **March 1 through August 31**, and leaves no permanent structure or permanent habitat disturbance, the action can proceed without an occupancy survey.

- b. If the action will occur during a breeding season, a survey for owls is required prior to commencing the activity. If owls are found, the activity should be delayed until outside of the breeding season.
- c. Rehabilitate access routes created by the project through such means as raking out scars, re-vegetation, gating access points, etc.

For all permanent actions that may impact owls or suitable habitat:

- a. Survey two consecutive years for owls according to accepted protocol prior to commencing activities.
- b. If owls are found, no disturbing actions will occur within 0.5 mile of an identified site. If nest site is unknown, no activity will occur within the designated current and historic Protected Activity Center (PAC).
- c. Avoid permanent structures within 0.5 mile of suitable habitat unless surveyed and not occupied.
- d. Reduce noise emissions (e.g., use hospital-grade mufflers) to 45 dBA at 0.5 mile from suitable habitat, including canyon rims. Placement of permanent noise-generating facilities should be contingent upon a noise analysis to ensure noise does not encroach upon a 0.5 mile buffer for suitable habitat, including canyon rims.
- e. Limit disturbances to and within suitable habitat by staying on designated and/or approved routes.
- f. Limit new access routes created by the project.

Modifications to the Surface Use Plan of Operations may be required in order to protect the MSO and/or habitat in accordance with Section 6 of the lease terms, the Endangered Species Act, and the regulations at 43 CFR 3101.1-2.

Purpose: To protect MSO habitat.

Exception: An exception may be granted by the Field Manager if authorization is obtained from USFWS (through applicable provisions of the ESA). The Field Manager may also grant an exception if an environmental analysis indicates that the nature or the conduct of the actions would not impair the primary constituent element determined necessary for the survival and recovery of the MSO and USFWS concurs with this determination.

Modification: The Field Manager may modify the boundaries of the stipulation area if an environmental analysis indicates and USFWS (through applicable provisions of the ESA) determines a portion of the area is not being used as Critical Habitat.

Waiver: A waiver may be granted if the MSO is de-listed and the Critical Habitat is determined by USFWS as not necessary for the survival and recovery of the MSO.

Southwestern willow flycatcher

In areas that contain riparian habitat within the range for the Southwestern willow flycatcher, actions would be avoided or restricted that may cause stress and disturbance during nesting and rearing of their young. Appropriate measures will depend on whether the action is temporary or permanent, and whether it occurs within or outside the nesting season. A temporary action is completed prior to the following breeding season leaving no permanent structures and resulting in no permanent habitat loss. A permanent action continues for more than one breeding season and/or causes a loss of habitat or displaces flycatchers through disturbances, i.e., creation of a permanent structure. Current avoidance and minimization measures include the following:

- Surveys would be required prior to operations unless species occupancy and distribution information is complete and available. All surveys must be conducted by qualified individual(s) and be conducted according to protocol.
- Activities would require monitoring throughout the duration of the project. To ensure desired results are being achieved, minimization measures would be evaluated and, if necessary, Section 7 consultation reinitiated.
- Water production would be managed to ensure maintenance or enhancement of riparian habitat.
- Where technically and economically feasible, use directional drilling or multiple wells from the same pad to reduce surface disturbance and eliminate drilling in suitable riparian habitat. Ensure that such directional drilling does not intercept or degrade alluvial aquifers.
- Activities would maintain a 300 feet buffer from suitable riparian habitat year long.
- Activities within 0.25 mile of occupied breeding habitat would not occur during the breeding season of **May 1 to August 15**
- Ensure that water extraction or disposal practices do not result in change of hydrologic regime that would result in loss or degradation of riparian habitat.
- Re-vegetate with native species all areas of surface disturbance within riparian areas and/or adjacent land.

Additional measures to avoid or minimize effects to the species may be developed and implemented in consultation with the USFWS between the lease sale stage and lease development stage to ensure continued compliance with the ESA.

Purpose: To protect southwestern willow flycatcher habitat.

Exception: An exception may be granted by the Field Manager if authorization is obtained from USFWS (through applicable provisions of the ESA). The Field Manager may also grant an exception if an environmental analysis indicates that the nature of the conduct of the actions, as proposed or conditioned, would not impair the primary constituent element determined necessary for the survival and recovery of the southwestern willow flycatcher and USFWS concurs with this determination.

Modification: The Field Manager may modify the boundaries of the stipulation area if an environmental analysis indicates, and USFWS (through applicable provisions of the ESA) determines that a portion of the area is not being used as southwestern willow flycatcher habitat.

Waiver: May be granted if the southwestern willow flycatcher is de-listed and if USFWS determines it is not necessary for the survival and recovery of the southwestern willow flycatcher.

Western yellow-billed cuckoo

No surface-disturbing activities would be conducted within 100 meters of Yellow-billed Cuckoo habitat (riparian areas) from May 15th through July 20th.

Purpose: To manage Yellow-billed Cuckoo habitat.

Exception: An exception may be granted by the Field Manager if authorization is obtained from USFWS (through applicable provisions of the ESA). The Field Manager may also grant an exception if an environmental analysis indicates that the nature of the conduct of the actions, as proposed or conditioned, would not impair the primary constituent element determined necessary for the survival and recovery of the Yellow-billed Cuckoo and USFWS concurs with this determination.

Modification: The Field Manager may modify the boundaries of the stipulation area if an environmental analysis indicates, and USFWS (through applicable provisions of the ESA) determines that a portion of the area is not being used as Yellow-billed Cuckoo habitat.

Waiver: May be granted if the Yellow-billed Cuckoo is de-listed and if USFWS determines it is not necessary for the survival and recovery of the Yellow-billed Cuckoo.

Colorado River Fish

Surface-disturbing activities within the 100 year floodplain of the Colorado River, Green River, and at the Dolores/Colorado River confluence would not be allowed. Other avoidance and minimization measures include:

- Surveys will be required prior to operations unless species occupancy and distribution information is complete and available. All surveys must be conducted by qualified individuals.
- Lease activities will require monitoring throughout the duration of the project. To ensure desired results are being achieved, minimization measures will be evaluated and, if necessary, Section 7 consultation reinitiated.
- Water production will be managed to ensure maintenance or enhancement of riparian habitat.
- Avoid loss or disturbance of riparian habitats.
- Conduct watershed analysis for leases in designated critical habitat and overlapping major tributaries in order to determine toxicity risk from permanent facilities

- Implement the Utah Oil and Gas Pipeline Crossing Guidance.
- In areas adjacent to 100 year floodplains, particularly in systems prone to flash floods, analyze the risk for flash floods to impact facilities, and use closed loop drilling, and pipeline burial or suspension according to the Utah Oil and Gas Pipeline Crossing Guidance, to minimize the potential for equipment damage and resulting leaks or spills.

Purpose: To protect critical habitat of the endangered Colorado River fishes.

Exception: An exception may be granted by the Field Manager if: 1) There is no practical alternative, and 2) the development would enhance riparian/aquatic values. This exception would require consultation with the USFWS. The Field Manager may also grant an exception if an environmental analysis indicates that the nature or the conduct of the actions, as proposed or conditioned, would not impair the primary constituent element determined necessary for the survival and recovery of the Endangered Colorado River, fishes.

Modification: The Field Manager may modify the boundaries of the stipulation area if an environmental analysis indicates, and USFWS (through applicable provisions of the ESA) determines a portion of the area is not being used as Critical Habitat.

Waiver: A waiver may be granted if the Endangered Colorado River Fishes are de-listed and the Critical Habitat is determined by USFWS as not necessary for the survival and recovery of the Endangered Colorado River fishes.

California Condor

Avoidance or use restrictions may be placed on portions on areas known or suspected to be used by condors. Application of appropriate measures will depend on whether the action is temporary or permanent, and whether it occurs within or outside potential habitat. A temporary action is completed prior to the following important season of use, leaving for habitat functionality. A permanent action continues for more than one season of habitat use, and/or causes a loss of condor habitat function or displaces condors through continued disturbance (i.e. creation of a permanent structure requiring repetitious maintenance, or emits disruptive levels of noise).

Current avoidance and minimization measures include the following:

- Surveys will be required prior to operations unless species occupancy and distribution information is complete and available. All Surveys must be conducted by qualified individual(s) approved by the BLM, and must be conducted according to approved protocol.
- If surveys result in positive identification of condor use, all lease activities will require monitoring throughout the duration of the project to ensure desired results of applied mitigation and protection. Minimization measures will be evaluated during development and, if necessary, Section 7 consultation may be reinitiated.
- Temporary activities within 1.0 mile of nest sites will not occur during the breeding season.

- Temporary activities within 0.5 miles of established roosting sites or areas will not occur during the season of use, August 1 to November 31, unless the area has been surveyed according to protocol and determined to be unoccupied.
- No permanent infrastructure will be placed within 1.0 mile of nest sites.
- No permanent infrastructure will be placed within 0.5 miles of established roosting sites or areas.
- Remove big game carrion to 100 feet from on lease roadways occurring within foraging range.
- Where technically and economically feasible, use directional drilling or multiple wells from the same pad to reduce surface disturbance and eliminate drilling in suitable habitat. Utilize directional drilling to avoid direct impacts to large cottonwood gallery riparian habitats. Ensure that such directional drilling does not intercept or degrade alluvial aquifers.

Reinitiation of section 7 consultation with the Service will be sought immediately if mortality or disturbance to California condors is anticipated as a result of project activities. Additional site-specific measures may also be employed to avoid or minimize effects to the species. These additional measures will be developed and implemented in consultation with the U.S. Fish and Wildlife Service to ensure continued compliance with the ESA.

Additional measures may also be employed to avoid or minimize effects to the species between the lease sale and lease development stages. These additional measures will be developed and implemented in consultation with the U.S. Fish and Wildlife Service to ensure continued compliance with the Endangered Species Act.

Navajo Sedge

The Lessee/Operator is given notice that the lands in this parcel contain suitable habitat for federally listed plant species under the Endangered Species Act. The following avoidance and minimization measures have been developed to facilitate review and analysis of any submitted permits under the authority of this lease

Site inventories:

1. Must be conducted to determine habitat suitability,
2. Are required in known or potential habitat for all areas proposed for surface disturbance prior to initiation of project activities, at a time when the plant can be detected, and during appropriate flowering periods,
3. Documentation should include, but not be limited to individual plant locations and suitable habitat distributions, and
4. All surveys must be conducted by qualified individuals.

Lease activities will require monitoring throughout the duration of the project. To ensure desired results are being achieved, minimization measures will be evaluated and, if necessary, Section 7 consultation reinitiated.

Project activities must be designed to avoid direct disturbance to populations and to individual plants:

- Designs will avoid concentrating water flows or sediments into plant occupied habitat.
- Construction will occur down slope of plants and populations where feasible; if well pads and roads must be sited upslope, buffers of 100 feet minimum between surface disturbances and plants and populations will be incorporated.
- Where populations occur within 200 ft. of well pads, establish a buffer or fence the individuals or groups of individuals during and post-construction.
- Areas for avoidance will be visually identifiable in the field, e.g., flagging, temporary fencing, rebar, etc.

For surface pipelines, use a 10 foot buffer from any plant locations:

- If on a slope, use stabilizing construction techniques to ensure the pipelines don't move towards the population.

For riparian/wetland-associated species, e.g. Navajo sedge, avoid loss or disturbance of riparian habitats:

- Ensure that water extraction or disposal practices do not result in change of hydrologic regime.
- Limit disturbances to and within suitable habitat by staying on designated routes.
- Limit new access routes created by the project.
- Place signing to limit ATV travel in sensitive areas.
- Implement dust abatement practices near occupied plant habitat.
- All disturbed areas will be re-vegetated with native species comprised of species indigenous to the area.
- Post construction monitoring for invasive species will be required.
- Where technically and economically feasible, use directional drilling or multiple wells from the same pad to reduce surface disturbance and eliminate drilling in plant habitat. Ensure that such directional drilling does not intercept or degrade alluvial aquifers.

Lease activities will require monitoring throughout the duration of the project. To ensure desired results are being achieved, minimization measures will be evaluated and, if necessary, Section 7 consultation reinitiated.

Additional measures to avoid or minimize effects to the species may be developed and implemented in consultation with the U.S. Fish and Wildlife Service between the lease sale stage and lease development stage to ensure continued compliance with the ESA.

