Appendix D
Final Biological Opinion

United States Department of the Interior

FISH AND WILDLIFE SERVICE

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

May 8, 2012

In Reply Refer To:
FWS/R6
ES/UT
08-F-0018
6-UT-11-F-015

Memorandum

To: Field Office Manager, Vernal Field Office, Bureau of Land Management, Vernal, Utah

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

Subject: Final Biological Opinion for the Kerr McGee Oil & Gas Onshore LP's Proposed Greater Natural Buttes Environmental Impact Statement/Biological Assessment.

In accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.), and the Interagency Cooperation Regulations (50 CFR 402), this transmits our final biological opinion for impacts to the threatened *Sclerocactus wetlandicus* (Uinta Basin hookless cactus) and the endangered Colorado pikeminnow *(Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), humpback chub (*Gila cypha*), and bonytail (*Gila elegans*); including their designated critical habitat. Reference is made to your correspondence and environmental impact statement/biological assessment (EIS/BA) received by this office on September 19, 2011 in which you requested formal consultation for this project.

Impacts to *Schoenocrambe argillacea* (clay reed-mustard) and *Penstemon grahamii* (Graham's beardtongue) were also discussed in the EIS/BA. We concur that this action may affect, but is not likely to adversely affect *S. argillacea*. We also conclude that this action is not likely to jeopardize the continued existence of or adversely modify proposed critical habitat of *P. grahamii*. We reached these conclusions based on the extremely limited distribution of these two species within the project area and adherence to the applicant-committed conservation measures included in Appendix L and M in the EIS/BA (see attachment 1).

Consultation History

This section summarizes significant steps in the consultation process:

Colorado River Fish Recovery Program

On January 21-22, 1988, the Secretary of the Department of the Interior; the Governors of Wyoming, Colorado, and Utah; and the Administrator of the Western Area Power Administration were cosigners of a Cooperative Agreement to implement the "Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin" (Recovery Program; Service 1987). The Recovery Program has been extended until September 30, 2013. An objective of the Recovery Program is to recover the listed species while providing for new water development in the Upper Colorado River Basin.

In order to further define and clarify processes outlined in sections 4.1.5, 4.1.6, and 5.3.4 of the Recovery Program, a section 7 Agreement (Agreement) and a Recovery Implementation Program Recovery Action Plan (RIPRAP) was developed. The Agreement establishes a framework for conducting all future section 7 consultations on depletion impacts related to new projects and all impacts associated with historic (defined as being initiated prior to January 1988) projects in the Upper Basin. Procedures outlined in the Agreement are used to determine if sufficient progress is being accomplished in the recovery of the endangered fishes to enable the Recovery Program to serve as a reasonable and prudent alternative to avoid jeopardy. The RIPRAP was finalized on October 15, 1993, and has been reviewed and updated annually.

In accordance with the 1993 Agreement, we assess the impacts of projects that require section 7 consultation and determine if progress toward recovery has been sufficient for the Recovery Program to serve as the reasonable and prudent alternative. As long as the Recovery Program achieves sufficient progress, biological opinions are written to identify activities and accomplishments of the Recovery Program that support it being used as the reasonable and prudent alternative. If sufficient progress in the recovery of the endangered fishes is not achieved by the Recovery Program, additional actions from the RIPRAP are identified for the project proponent to implement in order to avoid jeopardy to the endangered fishes. For historic projects, the Recovery Program serves as the reasonable and prudent alternative as long as recovery actions are completed according to the schedule identified in the RIPRAP. For new projects, the Recovery Program and/or addition actions identified from the RIPRAP serve as the reasonable and prudent alternative so long as they are completed prior to the project being implemented.

After many years of successful implementation of the Recovery Program and Agreement, Federal action agencies anticipate recovery activities that must be included in their project planning to avoid jeopardy to listed species. Thus, our reasonable and prudent alternative is essentially part of the proposed action. The Recovery Program now serves as a conservation measure within the proposed action and in many cases minimizes adverse effects to listed species or critical habitat. The following excerpts summarize portions of the Recovery Program that address depletion impacts, section 7 consultation, and project proponent responsibilities:

"All future section 7 consultations completed after approval and implementation of this program (establishment of the Implementation Committee, provision of congressional funding, and initiation of the elements) will result in a one-time contribution to be paid to the Service by water project proponents in the amount of $10.00 per acre-foot based on the average annual depletion of the project . . . This figure will be adjusted annually for inflation [the current figure is $19.21 per acre-foot] . . . Concurrently with the completion of the Federal action which initiated the consultation, e.g., . . . issuance of a 404 permit, 10 percent of the total contribution will be provided. The balance . . . will be . . . due at the time the construction commences . . . ."

It is important to note that these provisions of the Recovery Program were based on appropriate legal protection of the instream flow needs of the endangered Colorado River fishes. The Recovery Program further states:

". . . it is necessary to protect and manage sufficient habitat to support self-sustaining populations of these species. One way to accomplish this is to provide long term protection of the habitat by acquiring or appropriating water rights to ensure instream flows. Since this program sets in place a mechanism and a commitment to assure that the instream flows are protected under State law, the [U.S. Fish and Wildlife] Service (Service) will consider these elements under section 7 consultation as offsetting project depletion impacts."

On July 8, 1997, we issued an intra-Service biological opinion determining that the depletion fee for average annual depletions of 100 acre-feet or less are no longer required because the Recovery Program has made sufficient progress to be the reasonable and prudent alternative to avoid the likelihood of jeopardy to the endangered fishes and to avoid destruction or adverse modification of their critical habitat by these small depletions. The intra-Service biological opinion has been reinitiated several times since 1997 to account for additional water depletions. The most recent update occurred on June 4, 2010 and increased the cap for small water depletions to 12,000 acre-feet. This increase will allow us to continue to exempt small depletions of 100 acre-feet or less.

<u>Chronology of recent events and past consultations between the Bureau of Land Management (BLM) and US Fish and Wildlife Service (Service) with regard to this section 7 consultation:</u>

- 01/09/2012; emails between our office, your office, and Anadarko/Kerr McGee (KMG) to finalize mitigation measures in core conservation areas for *Sclerocactus wetlandicus.*

- 01/05/2012; we met with your office, the BLM state office, and KMG to discuss and finalize mitigation measures in core conservation areas for *Sclerocactus wetlandicus.*

- 12/9 through 12/19/2011; phone conversation with KMG to discuss additional mitigation measures in core conservation areas for *Sclerocactus wetlandicus.*

- 11/17/2011; conference call with KMG to discuss avoiding development in core conservation areas for *Sclerocactus wetlandicus.*

- 10/18/2011; we met with your office to discuss additional conservation measures for *Sclerocactus wetlandicus*.

- 09/19/2011; we received your final biological assessment.

- 08/15/2011; email exchange between us and your office concerning adaptive management strategies.

- 08/02/2011; we sent comments to your office on the final EIS.

- 07/25/2011; we received request to comment on preliminary final EIS.

- 08/30/2010; we sent comments to your office on the draft EIS.

- 07/16/2010; we received a request from your office to provide comments on preliminary draft EIS.

- 12/22/2009; we attended a teleconference regarding greater sage grouse mitigation measures.

- 01/09/2009; Email exchange between ENSR (now AECOM, the contractor and NEPA preparer for this project) and our office regarding water depletion calculations.

- 08/08/2008; we sent an email to Grasslands Consulting with references to use for assessing impacts of the proposed action to greater sage grouse and dust effects on vegetation.

- 11/30/2007; we sent comments to ENSR on the proposed EIS.

- 10/28/2007; we received a request to comment on the proposed EIS.

A complete administrative record for this project is on file in our office.

Biological Opinion

I. DESCRIPTION OF PROPOSED ACTION

The project area is approximately 162,911 acres centered on the White River corridor within Uintah County, Utah. Approximately 48 percent of these lands are administered by the BLM, 24 percent are administered by the Northern Ute Tribe, and 28 percent are administered by the State of Utah. Under the proposed action (Resource Protection Alternative of the EIS), Kerr McGee Oil and Gas Onshore LP (KMG), a wholly owned subsidiary of Anadarko Petroleum Corporation, proposes to drill 3,675 wells (1,484 new well pads and an additional 2,191 from existing well pads) and build associated access roads and pipelines among previously developed areas within the Greater Natural Buttes project area (GNBPA). Additionally, five mancamps

may be constructed as a part of the proposed development. New surface disturbance associated with the proposed action will be approximately 12,849 acres. The proposed well and mancamp development will be focused within the following Townships and Ranges of the project area (See Figure 1):

Township 8 south, Range 20-23 east, SLM
Township 9 south, Range 20-24 east, SLM
Township 10 south, Range 20-23 east, SLM
Township 11 south, Range 21, 22 east, SLM

Action Area

The action area is defined in 50 CFR 402 to mean "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the purposes of this consultation, we define the action area to encompass all of the project area proposed for well, road, pipeline and mancamp development; and those portions of waterways downstream of these work areas including the White and Green Rivers within and outside of the project area.

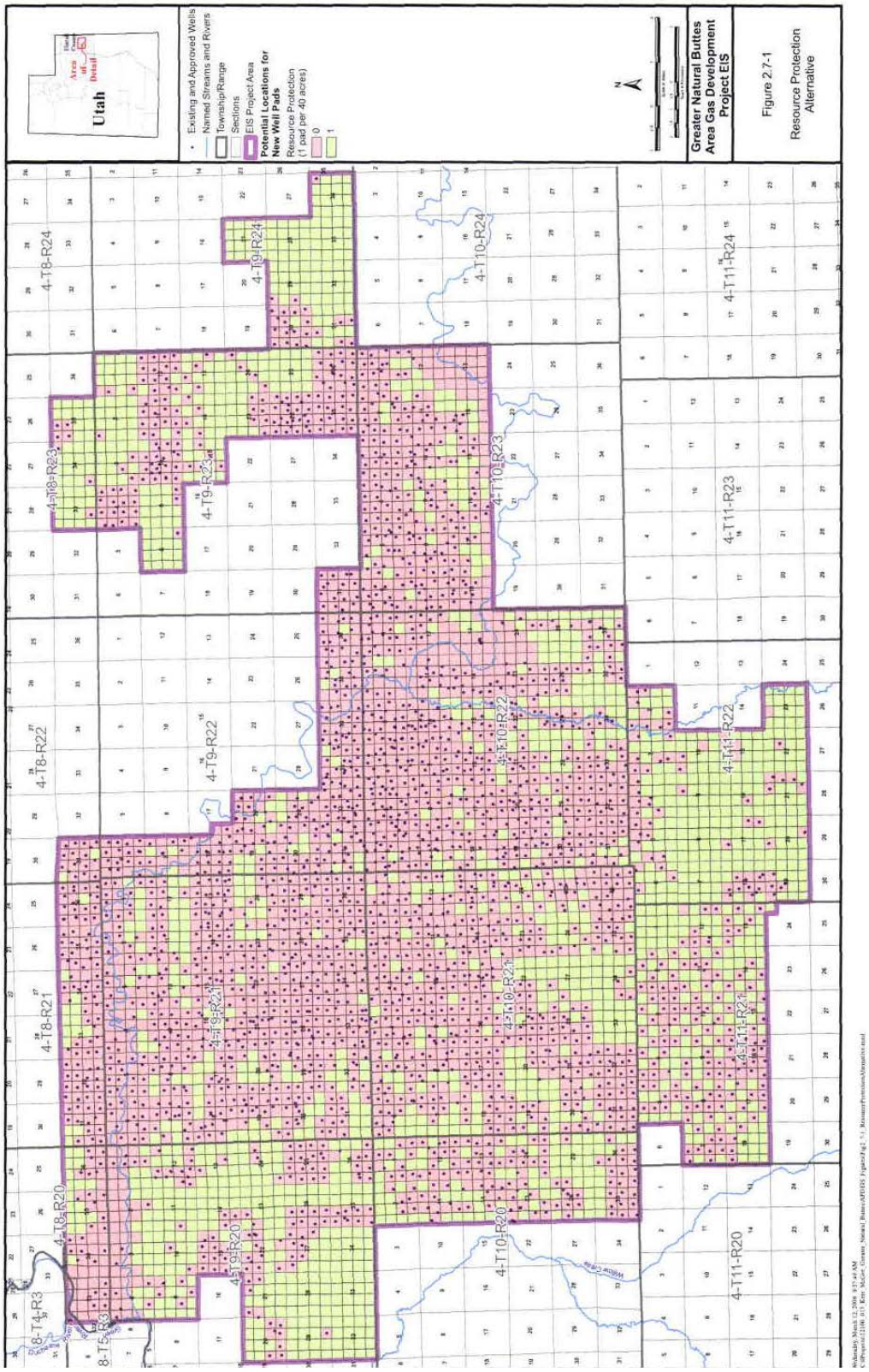

Figure 1 - Map of GNBPA from EIS/BA

Applicant Committed Conservation Measures

Conservation measures are actions that the action agency and applicant agree to implement to further the recovery of the species under review. The beneficial effects of conservation measures are taken into consideration for determining both jeopardy and incidental take analyses.

Colorado River Endangered Fish Species

The following applicant-committed conservation measures will help minimize the impacts of the Proposed Action to the four Colorado River endangered fish species:

- For areas of fresh water collection, an infiltration gallery will be constructed in a Service-approved location. An infiltration gallery is basically a pit or trench dug within the floodplain to a depth below the water table. Water is drawn from the pit rather than from the river directly. If this is not possible, limit pumping within the river to off-channel locations that do not connect to the river during high spring flows.
- If water cannot be drawn using the measures above and the pump head will be located in the river channel where larval fish are known to occur, the following measures apply:
    - Avoid pumping from low-flow or no-flow areas as these habitats tend to concentrate larval fishes;
    - Avoid pumping, to the greatest extent possible, during that period of the year when larval fish may be present (see previous bullet); and
    - Avoid pumping, to the greatest extent possible, during the midnight hours (10:00 p.m. to 2:00 a.m.) as larval drift studies indicate that this is a period of greatest daily activity. Dusk is the preferred pumping time, as larval drift abundance is lowest during this time.
- Screen all pump intakes with 3/32-inch mesh material.
- Report any fish impinged on the intake screen to the our office (801.975.3330) and the:

  Utah Division of Wildlife Resources
  Northeastern Region
  152 East 100 North
  Vernal, UT 84078
  Phone: (435) 781-9453

In addition, KMG agreed to have the Upper Colorado River Recovery Program (Recovery Program) serve as a conservation measure within the proposed action. The following paragraphs further clarify the Recovery Program's role:

In determining if sufficient progress has been achieved under the Recovery Program, we consider--a) actions which result in a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction; b) status of fish populations; c) adequacy of flows; and, d) magnitude of the Project impact. In addition, we consider support activities (funding, research, information, and education, etc.) of the Recovery Program if they help achieve a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate

extinction. We evaluate progress separately for the Colorado River and Green River Subbasins; however, it gives due consideration to progress throughout the Upper Basin in evaluating progress toward recovery.

Water depletion impacts can be offset by: a) the water Project proponent's one-time contribution to the Recovery Program in the amount of $19.21per acre-foot of the Project's average annual depletion; b) appropriate legal protection of instream flows pursuant to State law; and, c) accomplishment of activities necessary to recover the endangered fishes as specified under the RIPRAP. We believe it is essential that protection of instream flows proceed expeditiously, before significant additional water depletions occur. As the project's peak annual new depletion of 757 acre-feet is below the current sufficient progress threshold of 4,500 acre-feet, Recovery Program activities will serve as the conservation measures to minimize adverse effects to the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail and destruction or adverse modification of critical habitat caused by the project's new depletion.

With respect to (a) above (i.e., depletion charge), KMG will make a one-time payment which has been calculated by multiplying the Project's peak annual depletion (757 acre-feet) by the depletion charge in effect at the time payment is made. For Fiscal Year 2012 (October 1, 2011, to September 30, 2012), the depletion charge is $19.21 per acre-foot for the average annual depletion which equals a total payment of **$14,541.97** for this Project. A minimum of 10% of the total payment will be provided to the Service's designated agent, the National Fish and Wildlife Foundation (Foundation), at the time of issuance of the Federal approvals from the BLM, with the rest to be paid when construction commences. Fifty percent of the funds will be used for acquisition of water rights to meet the instream flow needs of the endangered fishes (unless otherwise recommended by the Implementation Committee); the balance will be used to support other recovery activities for the Colorado River endangered fishes. All payments should be made to the National Fish and Wildlife Foundation.

National Fish and Wildlife Foundation
1133 15th Street, NW
Suite 1100
Washington, DC 20005

Each payment is to be accompanied by a cover letter that identifies the Project and biological opinion that requires the payment, the amount of payment enclosed, check number, and any special conditions identified in the biological opinion relative to disbursement or use of the funds (there are none in this instance). A copy of the cover letter and of the check is to be sent directly to our office. The cover letter shall identify the name and address of the payer, the name and address of the Federal Agency responsible for authorizing the Project, and the address of the Service office issuing the biological opinion. This information will be used by the Foundation to notify the payer, the lead Federal Agency, and the Service that payment has been received. The Foundation is to send notices of receipt to these entities within 5 working days of its receipt of payment.

Sclerocactus wetlandicus

The following applicant-committed conservation measures will help minimize the impacts of the proposed action to *Sclerocactus wetlandicus* occupied habitats (for a complete list of applicant-committed measures, see Appendix L of the BA/EIS also included as attachment 1):

- Pre-project habitat assessments,
- Site inventories within suitable habitat,
- Minimization of surface impacts through project design,
- Adherence to a minimum buffer between the edge of the surface disturbance and identified plants and populations,
- Flagging of avoidance areas before and during construction, and
- Avoid concentrating water flows or sediments into occupied habitat

The following measures were instituted in the programmatic Biological Assessment for KMG/Anadarko's Natural Buttes and will be carried forward into the Greater Natural Buttes EIS:

- Where populations or individuals of *Sclerocactus wetlandicus* are located within 300 feet of the proposed edge of the ROW, the following actions will be taken to minimize the impacts:
    - Silt fencing will be used to protect cacti that are within 300 feet and down slope or downwind of surface disturbance. Fencing is intended to prevent sedimentation or dust deposition and will be evaluated for effectiveness by a qualified botanist.
    - A qualified botanist will be on site to monitor surface-disturbing activities when cacti are within 300 feet of any surface disturbance.
    - Dust abatement (consisting of water only) will occur during construction where plants are closer than 300 feet from surface disturbing activities.
    - Cacti within 300 feet of a proposed surface disturbance will be flagged immediately prior to surface-disturbing activities and flags will be removed immediately after surface-disturbing activities are completed. Leaving cacti flagged for as short a time as possible will minimize drawing attention to the cacti and reduce the potential for theft.
    - Pipelines will be sited to maximize the distance from adjacent *Sclerocactus wetlandicus*.
    - Project personnel associated with construction activities will be instructed to drive at a speed limit of 15 miles per hour on unpaved roads and to remain on the existing roads and ROWs at all times.
- For permanent surface pipelines, KMG will adhere to existing cacti survey/buffer guidelines of 300 feet or amended guidelines if developed by BLM and the Service. In areas where avoidance by 300 feet is not feasible and populations or individuals of *Sclerocactus wetlandicus* are within 50 feet of the proposed alignment of permanent surface lines, the following actions will be taken to minimize the impacts:
    - Flag individual cacti. Once pipe installation is complete remove the flagging.

    - Install protective fencing around cacti if they are down gradient of the surface pipe. Once pipe installation is complete, remove the protective fencing.
    - Have a qualified botanist present to monitor surface line installation.
- As per discussions and email with the BLM on October 18, 2011, KMG will contribute to the Utah *Sclerocactus* mitigation fund to further study the effects of development on *Sclerocactus wetlandicus* in the Uinta Basin and the effectiveness of current mitigation measures (see measure #2 below on page 11 for more details). This contribution will be provided over the first 5 years of project development and in lieu of the required 3-year monitoring described in the Vernal BLM RMP for cacti found within 300 feet of planned surface disturbance that cannot be rerouted. This is consistent with the intent of the RMP for the effects of development to be effectively monitored within the project area and to better assess conservation measures to avoid or minimize these impacts in the future.
- The following considerations are required for those wells where KMG deems completion fluid recycling is appropriate based on new well density and topography:
    - Temporary lines associated with recycling of completion water will be sited in existing ROWs. The pressure in the lines is less than 50 pounds per square inch (PSI) and the lines are constructed of rigid aluminum; therefore, virtually no movement will occur during operation.
    - If surface water completion lines are placed within the footprint of a road disturbance (i.e., where vegetation does not grow due to continued road use or maintenance activities), *Sclerocactus wetlandicus* surveys will not be necessary.
    - A qualified botanist will survey a 50-foot-wide corridor along roads where temporary lines are planned to ensure *Sclerocactus wetlandicus* is not present.
      If cacti are found within this 50-foot-wide survey corridor and avoidance is necessary (to ensure the line is more than 50 feet away from identified cactus) the new alignment will, if possible, be such that the cacti are topographically higher than the re-aligned line so that a potential spill from the line will not impact the identified cacti.
        - If it is not possible to re-align the surface lines to avoid individuals or populations of *Sclerocactus wetlandicus* that are within 50 feet of surface disturbance, the following actions will be taken to minimize impacts:
            - Flag individual cacti. Once pipe installation is complete, remove the flagging.
            - Install protective fencing around the cacti if they are down gradient of the surface pipe. Once pipe installation is complete, remove the protective fencing.
            - Have a qualified botanist present to monitor surface line installation.

In addition, through several discussions and meetings in December, 2011, and January, 2012, KMG /Anadarko committed to the following conservation measures in core conservation areas for *Sclerocactus wetlandicus*:

1. KMG will continue to abide by mitigation measures outlined in the 2010 Programmatic Biological Opinion (BO) (see mitigation measures above on pages 9 and 10).

2. To help mitigate impacts to cactus that may occur with development, KMG will fund cactus studies following approval of a final Greater Natural Buttes Record of Decision at a level of $60,000 per year for 5 years in lieu of the cactus study funding commitment outlined in the 2010 Programmatic BO. KMG will be allowed to review and provide input to cactus study

work plans prior to study implementation and will be given an opportunity to review study results prior to submittal of results for publication. KMG will exercise no control over final study designs or study results submitted for publication.

3. Avoidance of cactus by 300 feet will take priority in the expansion of pads within the cactus core conservation areas. When the 300-foot buffer cannot be avoided in pad expansions KMG will notify the Service and work with the BLM (and the BIA if on tribal surface) to determine a pad expansion that places a priority on avoiding cactus impacts.

4. KMG will follow existing ROWs and/or roads in constructing new buried pipelines within the cactus core conservation areas. For instances where a new buried pipeline is unable to follow an existing ROW and/or road (typically for safety reasons) and exceeds 600 feet in length, KMG will notify the Service and work with the BLM (and the BIA if on tribal surface) to determine a route that places a priority on avoiding cactus impacts.

5. KMG retains the right to perform necessary maintenance activities on all existing pipelines within the cactus core conservation areas. Maintenance activities will avoid impacts to cactus to the extent practicable.

6. KMG will not create new pads in the cactus core conservation areas without formal Service consultation, with the exception of 15 quarter-quarter sections within the cactus core conservation areas where new pad construction will be allowed as a condition of this consultation, with the following conditions:

    a. When topographically feasible, expansion of existing well pads will take priority in Level 1 cactus core conservation areas.
    b. Where feasible, new pads will be placed on or adjacent to existing disturbance (e.g. roads) in the cactus core conservation areas.
    c. Where topographically feasible, drill mats or similar devices will be used for new well pad development in the cactus core conservation areas.
    d. Due to the high value of Level 1 cactus core conservation areas, KMG will notify the Service and work with the BLM (and the BIA if on tribal surface) to determine new pad placement that places a priority on avoiding cactus impacts when in these areas.
    e. If feasible, new well pad development will not occur in cactus core conservation areas located in the northeast corner of the project area (i.e., the population located primarily in T8S R23E and the northern portion of T9S R23E).

7. KMG will fund a study in the amount of $100,000, in addition to typical expenditures for pad reclamation, to evaluate the technical feasibility of re-planting the Uinta Basin hookless cactus during pad reclamation activities. KMG will be allowed to review and provide input to the study work plan prior to study implementation and will be given an opportunity to review study results prior to submittal of results for publication. KMG will exercise no control over final study design or study results submitted for publication.

Integrated Weed Management Plan

An integrated weed management plan will be developed, and include the following components:

- Surveying for special status plant species before treating an area,
- Considering effects to special status species when designing herbicide treatment programs,
- Using drift reduction agents to reduce the risk of drift hazard, and
- Using selective herbicide and a wick or backpack sprayer to minimize risks to special plants

Other Applicant-Committed Measures

KMG has committed to well pad, pipeline and road construction methods that minimize impacts while providing protections from erosion, stream scour and other impacts to fish and wildlife. These applicant committed measures are outlined below:

- KMG will bury gas pipelines associated with new and future construction within 100-year floodplains.
- KMG will utilize the applicable Service's BMPs for work in Utah streams where pipelines or roads cross a stream. Additionally, KMG will utilize BLM Hydraulic Considerations for Pipeline Crossings of Stream Channels (prepared by the Utah State Office BLM, Salt Lake City, Utah).
- KMG will employ industry best management practices (BMPs) to control stormwater runoff, including appropriate measures to prevent disturbed sediments from reaching the White River drainage during precipitation events. New gathering pipelines will be installed parallel to and within approximately 10 feet of access road running surfaces unless precluded by topography, county prohibitions (where installed adjacent to County maintained roads), or other engineering constraints.
- KMG will utilize shared well pads to the extent possible, in consideration of technical, environmental, and economic viability, to minimize the amount of total surface disturbance in the GNBPA.
- KMG will develop a Transportation Plan that will detail the procedures intended to minimize construction of roads needed to implement Project activities. KMG's Transportation Plan will include construction procedures to prevent/minimize sedimentation that may result from road and/or pad construction. KMG will submit the plan to the Bureau of Land Management (BLM) prior to the initiation of Project activities.
- Each new produced water disposal well will be located on existing production locations.
- KMG will evaluate deepening existing wells to accomplish Mesaverde-only completions before twinning an existing well.
- KMG will strive to continually improve the development processes in order in minimize the surface impact where practical.
- KMG will implement Reasonable and Prudent Practices for Stabilization and develop Storm Water Pollution Prevention Plans for individual new construction sites associated with compressor stations, processing plants, and pipeline projects that disturb more than 5 acres.

- KMG will position two 15-foot emergency response spill trailers in areas in or near the GNBPA to respond to accidental spills or releases. At least one of the trailers will be located at a drilling site near the White River, if necessary. Each trailer will be equipped with 300 feet of 10-inch Techniboom, tow bridles, and anchor sets. In addition, the trailers contain sorbent pads, sorbent booms, flash lights, life jackets, Tyvek suits, and other safety equipment. KMG has conducted training sessions that included two days of instruction and field exercises with 15 field employees. The training was conducted by the Texas Engineering Extension Service Emergency Services Training Institute.
- KMG will not construct new mancamps within 0.5 mile of floodplains (including the floodplain) of major drainages (Sand Wash, Cottonwood Wash, Bitter Creek, White River, Green River); and within occupied Threatened and Endangered Plant habitat. This mitigation measure will be applied only if there is a demonstrated need (i.e., only if other mitigations do not adequately mitigate impacts).

KMG has committed to reclaim, to the standards established by the appropriate surface management agency, any disturbed areas that result from their construction activities. This includes aggressive control of noxious and invasive plant species within the project area and to re-establish vegetation in disturbed areas as outlined within their reclamation plan. The plan includes using a seed mix that can include both native and non-native, non-invasive species. The final reclamation should be such that additional noxious weed control will be minimized or become unnecessary in the future.

II. STATUS OF THE SPECIES / CRITICAL HABITAT

The purpose of this section is to summarize the best available information regarding the current range wide status of the listed fish and plant species. Additional information regarding listed species may be obtained from the sources of information cited for these species.

Sclerocactus wetlandicus

Sclerocactus glaucus (Uinta Basin hookless cactus), which included three identified subpopulations, was listed as a threatened species in 1979 (44 FR 58870). The decision to separate *S. glaucus* into three species is supported by recent genetic studies (Porter and others 2000), common garden experiments (Welsh and others 2003), and a reevaluation of morphological characteristics (Heil and Porter, 2004). We currently recognize *S. glaucus* as three distinct species: *S. brevispinus* (Pariette cactus), *S. glaucus* (Colorado hookless cactus), and *S. wetlandicus* (Uinta Basin hookless cactus). These three species retain their threatened status (74 FR 47112, September 15, 2009).

Below we discuss the status of *Sclerocactus wetlandicus* and new biological information as it pertains to the proposed project. Additional information on this species' life history, population dynamics, status, and distribution is described in detail within the "Recovery Plan for the Uinta Basin Hookless Cactus" (Service, 1990c) and the more recent recovery outline (Service, 2010a).

Sclerocactus wetlandicus is typically found on coarse soils derived from cobble and gravel stream terrace deposits, or rocky surfaces on mesa slopes at 1,350 to 1,900 meters (4,400 to

6,200 feet) elevation (Service, 1990c; Heil and Porter, 2004). Other habitat types recognized for this species include desert pavement, white or gray shale, and tan shale with near complete dominance by *Ephedra torreyana* (Torrey ephedra) (SWCA 2010; Glisson 2011).

An as-yet undescribed taxa of the *Sclerocactus* genus also occurs within the project area. This population of *S. wetlandicus* is morphologically unique and disjunct from other populations of *S. wetlandicus*. Temporarily named *S. wetlandicus*-var1, individuals of this variant of *S. wetlandicus* can be fertilized with their own pollen. This distinguishes it from other populations of *S. wetlandicus* which are outcrossing and require pollen from flowers of different plants to produce viable seeds (Tepedino *et al.* 2010).

Flowers of *S. wetlandicus* typically open in mid-day and close late in the afternoon for three to five days (Tepedino *et al*. 2010). A broad assemblage of native, ground-nesting bees, mostly from the family Halictidae (Tepedino *et al*. 2010), pollinate *S. wetlandicus.* These bees can travel from 0.4 to 1 km between plants (Tepedino pers. comm. 2010). Other insects, including ants and beetles, may also pollinate *S. wetlandicus* (Service 1990). Limiting the amount of fragmentation and disturbance within the habitats of *S. wetlandicus* is important to maintain adequate pollinator habitats and healthy cactus populations.

About four to five weeks after flowering, the fruits of *Sclerocactus wetlandicus* reach maturity, each containing approximately 20 seeds (Tepedino *et al.*, 2010). The fruits open and fall away, leaving the seeds on the apex of the plant where they are washed to the ground and dispersed by rain (Tepedino *et al.*, 2010). The life history and population dynamics of these species are poorly known, but they are thought to be long-lived perennials, usually flowering after 3 or 4 years.

In 2010, we developed a potential habitat polygon for *Sclerocactus wetlandicus* to better illustrate the species' distribution and abundance. Although both *Sclerocactus* species' populations can be found outside of these areas, they tend to occur in greater numbers and at higher densities within the polygons. This polygon is updated annually based on new survey information, and was last updated in March 2011 (Service and BLM, 2011).

The total area of potential habitat for *Sclerocactus wetlandicus* is 442,000 acres and includes federal, tribal, state, and private lands. Our most current geographic data for *S. wetlandicus* includes over 18,400 points representing approximately 40,528 individual cacti. These numbers include living and dead plants, but do not include hybrids of *S. wetlandicus* and *S. brevispinus* which occur outside of the action area where these two species overlap. Based on recent survey data (BLM and Service, 2011) and extrapolation to unsurveyed, suitable habitat, we predict the total count for *S. wetlandicus* to be at least 50,000.

We do not have population trend data for *Sclerocactus wetlandicus*. However, as described below, the high levels of energy development result in the loss and fragmentation of habitat for these species across their range. Thus, we conclude it is likely that this species and its available habitat are declining.

Habitat loss and fragmentation associated with energy development is a major threat to this species across its known range. There are 5,161 oil and gas well locations within the *Sclerocactus wetlandicus* potential habitat polygon (UDOGM 2011). If we estimate 5 acres of disturbance per well site (at 40 acre spacing) and associated roads, then at least 25,800 acres (6 percent) of the *S. wetlandicus* potential habitat polygon is directly impacted by energy development facilities. Indirect disturbances are much greater and can extend 400 meters from the disturbance based on impacts to the species' pollinators and their habitats (Tepedino *et al.* 2010). We estimate that 35 percent of potential habitat across the range of S. wetlandicus is impacted through direct and indirect disturbance due to oil and gas development.

In addition to existing development, approximately two-thirds of the potential habitat polygon for *Sclerocactus wetlandicus* is leased for oil and gas development. At least 17,000 wells are planned for development in the Uinta Basin in the next 15 years, and thus the amount of surface disturbance across *Sclerocactus* habitat will increase substantially.

There are two levels at which oil and gas development impact *Sclerocactus wetlandicus*: 1) on a localized level within the immediate proximity of known cactus locations, and 2) on a broader landscape scale. Loss of individual plants and direct impacts are minimized through the incorporation of mitigation measures through the consultation process. For example, we recommend that oil and gas development maintain a 300-foot buffer between surface disturbance and listed plants on federally-managed lands in order to minimize the direct loss and indirect disturbances (e.g., fugitive dust) to individual cacti. However, exceptions to this 300-foot buffer are allowed with the additional commitment to continue to monitor plants that fall within the buffer. As a result, at least 320 wells are now located within 300 feet of known cactus locations (UDOGM, 2011). Some of these well locations are historical or were developed without section 7 consultation because they were thought to occur outside of the range of the species. We do not have an accurate way to estimate how many cacti were lost or disturbed from development of these wells.

It is more difficult to implement conservation for the species on a broader landscape scale. Substantial energy development already exists within the species' occupied and potential habitat. We estimate that at least 9 percent of known occupied habitat for Sclerocactus species is directly disturbed by oil and gas development. Indirect effects such as habitat fragmentation, fugitive dust, and invasive species extend out beyond 300 feet (see, for example, Walker and Everett, 1987; Myers-Smith *et al.*, 2006; Farmer, 1993), and the most common pollinators for *Sclerocactus* species can potentially be impacted at a distance of at least 400 meters (1,312 feet) from direct surface disturbances (Tepedino *et al.*, 2010; Tepedino pers. comm., 2011). Thus, at least 51 percent of the known occupied habitat is directly and indirectly impacted by energy development. Conversely, this means less than half of occupied *Sclerocactus* habitat remains undisturbed (including both direct and indirect effects). Overall, the extensive amount of energy development projects across the Uinta Basin results in increased habitat fragmentation, fugitive dust, invasive species, and hydrologic changes across the landscape, and likely negatively impacts *Sclerocactus* populations.

We believe it is necessary to avoid and minimize additional surface disturbances in the most important *Sclerocactus* habitats so that we can effectively conserve and recover the species.

Thus, we have established areas that we refer to as "core conservation areas." Core conservation areas contain the densest known occupied habitat of *Sclerocactus*. Core conservation areas are consistent with our recovery plan objectives that recommend establishing formal management designations to provide for long-term protection of important populations and habitat (Service 1990c, Service 2010a).

We established two levels of core conservation areas based on pollinator travel distance and designed the areas to provide habitat connectivity between populations and individuals. Connectivity between sub-populations is important because *Sclerocactus* species are out-crossing and require pollen from another plant's flower to produce viable seed (Tepedino *et al.*, 2010). The most common *Sclerocactus* flower visitors are Halictinae bees (a subfamily of bees that pollinate *Sclerocactus*) that can travel from 400 meters to 1,000 meters (Tepedino *et al.*, 2010). These bees also use other native plants as food sources, and protecting overall native plant diversity is important to protect *Sclerocactus* pollinators (Tepedino *et al.*, 2010). Finally, protecting bee nests is critical (Tepedino *et al*., 2010), but we do not currently have a reliable way to identify bee nests in the field.

Level 1 polygons were developed using a 400-meter buffer around plants to allow for pollinator travel and include the densest concentrations of cactus locations and the most restrictive management recommendations. Level 2 polygons were developed using a 1,000-meter buffer around plants while incorporating less-dense cactus areas and less restrictive management recommendations.

We recommend no additional direct disturbance within level 1 core conservation areas and a direct disturbance cap of 5 percent within level 2 core conservation areas. The 5 percent threshold allows a low to moderate level of disturbance in areas with dense cactus populations while limiting additional disturbance in areas that are already highly disturbed.

Within core conservation areas, we estimate approximately 7 percent of the land surface contained within level 1 and level 2 core conservation polygons is already directly disturbed by energy development. This direct disturbance exceeds the 5 percent we recommend in the core areas indicating a need to avoid and minimize further impacts and develop successful reclamation techniques. By applying the same calculations we used for occupied habitat above, we estimate that 67 percent of level 1 and level 2 core conservation areas is directly and indirectly disturbed by energy development.

Colorado River Fishes

The Colorado pikeminnow and humpback chub were listed as endangered on March 11, 1967 (32 FR 4001); the bonytail was listed as endangered on April 23, 1980 (45 FR 27710); and the razorback sucker was listed as endangered on October 23, 1991 (56 FR 54957). Critical habitat was designated for all four fish species on March 21, 1994 (59 FR 13374). Species descriptions, critical habitat information, life history, population dynamics, and the species status, distribution, and recovery goals are described in detail within their respective Recovery Plans and amendments (Service 1990a and b, 1991, 1997, and 2002a-d). The Colorado pikeminnow and razorback sucker have designated critical habitat within the Green and White Rivers in Uintah

County and within the project area. The bonytail and humpback chub have designated critical habitat downstream of the project area within the Green River.

III. ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as follows:

- 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.

Our evaluation of the environmental baseline is based on the best available information and differs in part from the evaluation in the BLM BA because the BA was developed prior to our most recent assessments of occupied and suitable *Sclerocactus* habitats.

Status of the Species within the Action Area

Sclerocactus wetlandicus

As described above, we delineated a potential habitat polygon for *Sclerocactus wetlandicus* to better understand the species distribution and abundance across its range. Although *S. wetlandicus* populations can be found outside of these areas, they tend to be more isolated and occur in low densities. The total area of potential habitat for *S. wetlandicus* across its range is 442,205 acres. Based on this polygon, we estimate that approximately 89,000 acres of *S. wetlandicus* potential habitat (~20 percent) occurs within the action area, and approximately 34,700 acres (~8 percent) of this habitat is on BLM land. The remaining 54,300 acres of potential habitat occur on private, state, and tribal lands.

As previously discussed, we estimate approximately 50,000 *Sclerocactus wetlandicus* rangewide. There are at least 5,636 *S. wetlandicus* individuals within the action area (approximately 11 percent of the total estimated population) (BLM and Service 2011). Of 1,503 known *Sclerocactus wetlandicus*-var1 individuals, 247 (16 percent) fall within the action area.

Colorado River Endangered Fishes

All four endangered Colorado River endangered species are found in the Green River and the Colorado pikeminnow and razorback sucker are also found in the White River. Additional detail of these populations is discussed below:

One of three Colorado pikeminnow populations, the Green River subbasin population, will be affected by this project. This population was estimated at 6,000 to 8,000 adults (Nesler *et al.*

2003; Service 2002a) and was determined to be declining in 2001-2003 (Bestgen *et al.* 2005). However, recent research has shown increased recruitment during favorable water years.

The Green River subbasin population of razorback sucker is likely to be impacted by this action, and this population is estimated at 500 to 1,000 fish (Modde *et al.* 1996; Lanigan and Tyus 1989). Within the White River, razorback suckers are found in low numbers from the confluence with the Green River to the Enron boat take out, located approximately 30 miles upstream. However, they may potentially occur up to Taylor Draw Dam (Service 2002b). In 2011, razorback sucker were documented spawning in the White River; thereby increasing the importance of this waterway to the species' recovery. The Green River from the confluence with the Yampa River to Sand Wash has the largest existing riverine population of razorback sucker (Lanigan and Tyus 1989; Modde *et al.* 1996).

The Desolation/Gray Canyon population of humpback chub is likely to be impacted by this action, and this population is currently estimated at 1,500 fish (Service 2002c). Each population of humpback chub consists of a discrete group of fish, geographically separated from the other populations, but with some exchange of individuals. Monitoring humpback chub populations is ongoing and sampling protocols and reliability of population estimates are being assessed by the Service and cooperating entities. The Utah Division of Wildlife Resources has monitored the fish community in Desolation and Gray Canyons since 1989 and has consistently reported captures of age-0, juvenile, and adult *Gila*, including humpback chub, indicating a reproducing population (Chart and Lentsch 1999).

Bonytail were once widespread in the Colorado River Basin (Chamberlain 1904). Surveys from 1964 to 1966 found large numbers of bonytail in the Green River in Dinosaur National Monument downstream of the Yampa River confluence (Vanicek and Kramer 1969). However, few bonytail were captured after 1973, and the last recorded capture in the Green River was in 1985 (Service 2002d). Following this evident decline, large numbers of bonytail were stocked in the Green River Basin between 1998 and 2009. In 2009, biologists working on the Green River in the Uintah Basin, Utah, captured in excess of 40 bonytail stocked more than a year earlier, indicating some success of recent stocking activities. (Upper Colorado River Endangered Fish Recovery Program & San Juan River Basin Recovery Implementation Program 2010).

Factors Affecting the Species within the Action Area

Sclerocactus wetlandicus

The action area incorporates at least nine other highly-developed existing oil and gas fields, most of which are included in the larger Natural Buttes Field. Approximately 2,281 wells are drilled across the action area within the *Sclerocactus wetlandicus* potential habitat polygon across all landowners (Utah Division of Oil, Gas, and Mining [UTDOGM] 2011). Some of these wells are plugged and abandoned, shut-in, or the location was abandoned, but they may be reopened for future development. We estimate that at least 11,405 acres of land, or ~13 percent of the potential habitat polygon in the action area, is directly disturbed by these well locations. Similar amounts of development have occurred across the known range of *S. wetlandicus*-var1.

The action area includes portions of the White River and Bonanza core conservation areas for *Sclerocactus wetlandicus*, where substantial disturbance has already occurred (Table 1). A minor portion of the Upper Green River level 2 core conservation area occurs within the action area (27 acres, or less than 0.5 percent of the total area). However, no development is proposed within this conservation area, so we exclude it from further analysis.

Table 1. Estimated existing disturbance in core conservation areas where they overlap the action area. Level 2 core conservation areas are inclusive of level 1 areas.

	Core Conservation Areas			
	White River		**Bonanza**	
Within action area:	**Level 1**	**Level 2**	**Level 1**	**Level 2**
percent of core area	85%	86%	26%	31%
estimated number of well pads in core area	241	744	9	36
estimated acres direct surface disturbance in core area	1,205	3,720	45	180
estimated percent direct surface disturbance in core area	16%	16%	10%	9%
estimated percent direct plus indirect disturbance (1,312 feet or 400 meters) in core area	96%	98%	95%	79%

Sclerocactus wetlandicus is experiencing direct and indirect impacts from existing oil and gas development within the action area. Direct and indirect impacts include increased mortality, increased illegal collection, habitat fragmentation, further introduction and spread of invasive species, the possible loss of pollinators, increased fugitive dust, and increased erosion.

Mortality occurs when a cactus is accidentally kicked, stepped on, or driven over by humans. As roads and pipelines increase within occupied habitat, the chance for mortality increases. Other factors, such as livestock grazing, may exacerbate this situation by focusing impacts within the remaining interspaces between roads and wells, leading to further cactus mortality.

Illegal collection of *Sclerocactus wetlandicus* historically was one of the primary threats to the conservation and recovery of this species (BLM, 2008a). The increase in the number of access roads within and near occupied habitats allows greater access to rare plant populations and increased illegal collection of the species.

Habitat fragmentation occurs as a result of the increased number of access roads, pipeline and other utility ROWs, and long-term surface disturbance from well pads and associated facilities. The anthropogenic fragmentation of plant habitats can decrease species density (Mustajarvi and others 2001) and result in isolated, smaller populations that are more prone to extinction (Forman and Alexander, 1998). Decreased species density has the potential to adversely impact pollination and reproductive success of *Sclerocactus wetlandicus* (Mustajarvi *et al.*, 2001).

Increased habitat fragmentation from roads can also act as a barrier to plant pollination and seed dispersal (Bhattacharya and others 2003; Ness, 2004).

Noxious and invasive plant species directly compete for resources with native species such as *Sclerocactus wetlandicus* and alter habitat making it more difficult for the species to survive and thrive. Seeds from invasive species are often carried by vehicles and spread via vehicle-caused air turbulence (Forman and Alexander, 1998). Within the action area, noxious and invasive species are often present in the soil seed bank, and once an area is disturbed, these species can quickly establish. In addition, competition from noxious and invasive species can further reduce special status species' population size. Invasive plants spread more easily when other land uses such as livestock grazing are concentrated within the remaining interspaces between roads and wells. The cumulative pressures of energy development and grazing can lead to more invasive plants in *Sclerocactus wetlandicus* habitat.

The spread of noxious and invasive plants may change species composition within native plant communities. This may lead to increased livestock grazing on native grasses and shrubs that act as "nurse" plants for immature cacti. Nurse plants create an environment that is more favorable for successful establishment of immature cacti by providing shade, moisture, and protection from trampling.

Pollinators and their nesting sites are directly disturbed by oil and gas activities. Additionally, habitat alteration from invasive species can alter pollinator composition in the area, thereby possibly reducing the effectiveness of pollination within the native community. All of these connected actions reduce the ability of *Sclerocactus wetlandicus* to thrive within its native habitat.

Surface disturbances can lead to increased dust, erosion and storm water runoff that could impact *Sclerocactus wetlandicus*. Construction activities, increased access roads, and increased vehicular traffic within and near occupied habitats will lead to increases in fugitive dust and particulates. Dust accumulation is higher near roads, with fugitive dust depositing up to 984 feet from the source (Everett, 1980). Dust accumulation may adversely impact photosynthesis, respiration, transpiration, water use efficiency, leaf conductance, growth rate, gas exchange, and growth (Everett, 1980; Thompson and others 1984; Sharifi and others 1997; Trombulak and Frissell, 2000; Hobbs, 2001; Farmer, 1993). Erosion and runoff, though natural events, can have direct impacts to cacti from burying to direct removal of individuals. Erosion and runoff can be altered by human activities—for example, vegetation removal and alteration of stream courses—making these events more catastrophic. These augmented events can lead to greater damage to native ecosystems through additional scour and burial of soils and plants. Increases in dust, erosion, and storm water runoff interact cumulatively with other negative effects to further fragment and disturb *S. wetlandicus* populations.

Colorado River Endangered Fishes

The primary factors affecting the four endangered Colorado River fish are stream flow regulation and habitat modification; competition with and predation by nonnative fishes; and pesticides and pollutants (Service 2002a–d). The existing habitat, altered by these threats, is modified to the

extent that it impairs essential behavior patterns, such as breeding, feeding, and sheltering. The primary impacts from oil and gas development, which may lead to the factors listed above, are water depletion and degradation of water quality through sediments and pollutants released to waterways close to or within critical habitat.

IV. EFFECTS OF THE ACTION

The effects of the action refer 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 and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. 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.

KMG is proposing to develop up to 3,675 new wells, as well as ancillary roads and pipelines. The proposed work action is estimated to directly disturb an additional 8,147 acres through these well development and pipeline construction activities. These activities will add approximately 5 percent more direct disturbance to the action area, for a total cumulative disturbance of 12.7 percent of the action area.

Sclerocactus wetlandicus

As previously described, there are at least 89,000 acres of *Sclerocactus wetlandicus* potential habitat within the action area (using the potential habitat polygon from 2011). Thus, if we assume relatively equal distribution of surface disturbance across the action area, and approximately 5 percent of the action area is expected to be directly disturbed, we can expect that 4,450 acres of *S. wetlandicus* potential habitat will be lost through this action. This is about 1 percent of the total potential habitat for *S. wetlandicus* across its entire range.

We assume that proposed well pads would most likely be placed near the center of quarter-quarter sections, which places approximately 451 cacti within 300 feet of proposed well pad locations. This number does not include plants within 300 feet of planned roads and pipelines because we do not know potential locations for these types of disturbances. These areas have not been completely surveyed, so it is likely that more plants will be found as more surveys are conducted. The effects from roads and other disturbances can extend far beyond 300 feet (see, for example, Walker and Everett, 1987; Myers-Smith et al., 2006; Farmer, 1993).

Sclerocactus wetlandicus plants will be avoided to the extent possible through the applicant-committed measures described in Appendix L of the BA/EIS (attachment 1), and in the Proposed Action section of this biological opinion. Nevertheless, individual plants could be within 300 feet of a work area under the Agency's Preferred Alternative. The total estimate of plants that may be directly affected represents less than 1% of the total estimated population of 50,000 individuals.

We expect additional surface disturbance and habitat fragmentation with the development of new

well pads, well pad expansion, buried pipelines, and roads in core conservation areas (Table 2). KMG estimates that up to 15 new well pads may be constructed within the core conservation areas. Although we do not know the exact location of the potential 15 new well pads, KMG expects these to be developed on the south side of the White River (mostly located in Township 9S, Range 21 E). Dense sites of cacti occur in this area: we estimate at least 400 plants occur within the approximately 31 quarter-quarter sections proposed for development south of the White River.

Table 2. Existing and proposed development in level 2 core conservation areas that overlap with action area. Level 2 core conservation areas are inclusive of level 1 core conservation areas.

	Core Conservation Areas	
	White River	**Bonanza**
Number of existing well pads	744	36
Existing surface disturbance, percent (acres)	16% (3,720)	9% (180)
Estimated number of additional well pads from proposed action	15	0
Maxiumum additional surface disturbance from proposed action, percent (acres)	0.3% (75)	0
Estimated total surface disturbance (existing + proposed action)	16%	9%

Indirect impacts will occur along approximately 325 miles of new roads (54 percent of the total project's 594 miles of new roads) within potential habitat under the Agency's Preferred Alternative. Deposition of wind-blown soil onto *Sclerocactus wetlandicus* individuals during construction and use of these roads will negatively impact the cactus through reduced photosynthesis (BLM, 2008b). The expanded road network and surface disturbance from project-related construction will increase sediment delivery to the small ephemeral drainages and areas of overland flow associated with *S. wetlandicus*. *S. wetlandicus* is not tolerant of heavy sedimentation (BLM, 2008b), and increased sedimentation will increase the risk of mortality or stress to an unspecified number of *S. wetlandicus* located near disturbed areas.

Additional indirect impacts to *Sclerocactus wetlandicus* include an increased risk of crushing by off-road vehicles due to an expanded road network in the action area, impacts from herbicides used to control invasive plants in the project area, and possible reductions in pollination or seed dispersal due to a larger road network and resulting habitat fragmentation and dust. Because *S. wetlandicus* requires insect pollinators for successful reproduction (Tepedino *et al.* 2010), impacts to pollinator nesting and foraging habitats will negatively affect the cactus by reducing the diversity and abundance of pollinators and, thereby, the plant's ability to successfully reproduce. The expanded road network also will increase the risk of illegal collecting of *S. wetlandicus*.

Although the conservation measures described in the BA/EIS and Appendix L of the BA/EIS will minimize the impacts of the action to *Sclerocactus wetlandicus*, larger landscape-level changes such as increased habitat fragmentation and habitat loss, pollinator disturbance, changes in erosion and water runoff, and increased weed invasion cannot be entirely negated. These disturbances will continue to negatively impact *S. wetlandicus* throughout the action area.

Colorado River Endangered Fishes

This project will adversely affect Colorado pikeminnow, razorback sucker, bonytail, and humpback chub by reducing the amount of water in the river system upon which they depend by up to 757 acre-feet/year. The effects to all four species primarily result from the effects of the water depletion upon their habitats. The amount of water removed by the proposed action is below the current sufficient progress threshold of 4,500 acre-feet. However, the cumulative effect of water depletions, including from this action, adversely affects the four listed fish by further reducing the amount of water available to them, increasing the likelihood of water quality issues, increasing their vulnerability to predation, and reducing their breeding opportunities by shrinking the amount of breeding habitat within their range. Water depletions also reduce the ability of the river to create and maintain the primary constituent elements that define critical habitats.

Parts of the action area are located in close proximity of the Green and White Rivers which could lead to direct and indirect affects due to proposed work activities. Flow regulation and effects of non-native fish species can be increased in part from water depletion as described above, though should not be compounded by proposed work activities since water depletion will not occur during a single event but over many small events spaced over the life of the project. The same is true for habitat modification since no work is being proposed in stream corridors in close proximity to the Green and White Rivers.

There is a greater potential for impacts from pollutants, if a pipeline, well pit, or other source were to inadvertently release contaminated fluids into waterways at points near the Green and White Rivers. Through direct or indirect discharge, these pollutants could reach the Green and White Rivers and negatively impact water quality to the point of affecting native fish populations. Direct impacts will result from a discharge from a pipeline or well pit reaching the Green and White Rivers in its original form or within a single release event. Indirect effects occur when discharges are released to the ground and are later released to the river after being carried by an erosion event or carried by rain or snowmelt runoff. As more well and pipeline development occurs in the project area the chance of pollutants reaching the White and Green Rivers increases, thus increasing the potential of harm to native fish populations.

While applicant-committed measures will reduce the chance for spills or leaks of contaminants, accidental releases can and do still occur. According to the National Response Center, there have been at least 219 spills and releases within Carbon, Duchesne, and Uintah Counties from January 1991 through August, 2011 due to oil and gas development and related activities affecting water, land and air.

Spill incidences reviewed in Utah include corrosion and leakage of surface and buried pipelines, broken well rods, valve and gasket failures, wellhead pressure buildups, shutoff alarm malfunctions, leakage of trace systems, loss of formation water to the surface during drilling, and vehicular related traffic accidents. Releases have included crude oil, natural gas, hydrochloric acid, condensate, salt water, ethylene glycol, and produced water in various quantities.

Releases of harmful agents into floodplain habitats could result in significant adverse impacts to the endangered fish and their designated critical habitat. One of the constituent elements of the designated critical habitat for the four Colorado River fish is contaminant-free water. Any release of contaminants into the floodplain will result in degradation of critical habitat and could result in take of individual fish, including downstream impacts to larvae and juveniles.

The Green and White Rivers are large to medium-sized rivers with variable dilution factors based on seasonal flows. However, contaminants are likely to accumulate in backwater/depressional areas that have reduced dilution and less flushing capacity (Woodward *et al.* 1985). Colorado pikeminnow and razorback sucker use these sites downstream, which provide cover and a food source, for overwinter survival and rearing areas. The proposed action includes applicant committed measures to minimize and reduce the potential for contaminants to be released into the natural systems. However, oil and gas related accidents can be severe and have serious consequences to fish and wildlife resources.

Although most incidents are relatively small in size, large scale spills do occur. If large-scale breaks occur in sensitive resource areas, the results can be catastrophic to fish and wildlife resources. The effects of smaller leaks that may cause chronic, sub-lethal effects to fish populations may be more prevalent. While the oil and gas industry has a wide variety of methods available to detect substantial leaks or integrity breeches, the technology for detection of small “pinhole” leaks is not as advanced. This creates a significant problem in that the current available methodology may allow small leaks to go undetected for extended periods of time often evading detection until they are manifested on the surface sediments or water.

The severity of the impacts from larger spills will be dependent on the time of year, the river flows, presence of endangered fish, and the volume of the contaminant plume. Immediate effects of small leaks to fish populations are difficult to ascertain but will likely become evident in future reproductive or growth issues.

V. 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 ESA.

Declines in the abundance or range of many special status species are attributable to various human activities on Federal, state, and private lands, such as human population expansion and associated infrastructure development; construction and operation of dams along major waterways; water retention, diversion, or dewatering of springs, wetlands, or streams; recreation,

including off-road vehicle activity; expansion of agricultural or grazing activities, including alteration or clearing of native habitats for domestic animals or crops; and introductions of non-native plant, wildlife, or fish or other aquatic species, which can alter native habitats or out-compete or prey upon native species. Many of these activities are expected to continue on State and private lands within the range of various federally protected wildlife, fish, and plant species, and could contribute to cumulative effects to the species within the action area. Species with small population sizes, endemic locations, or slow reproductive rates will generally be more susceptible to cumulative effects.

Sclerocactus wetlandicus

Non-federal activities have the potential to cumulatively affect *Sclerocactus wetlandicus*, as a significant portion of this species' range occurs on state, private, and tribal lands without federal mineral leases or federal surface rights. Quantified data on the future extent of these activities are difficult to obtain, but we must assume, for the purposes of this assessment, that some level of these activities are reasonably certain to occur, particularly energy and mineral exploration and development, livestock grazing, stone collecting, off-highway vehicle use, and illegal collecting.

Our data show approximately 541 individual *Sclerocactus wetlandicus* located on lands with no federal nexus, or about 10 percent of the known individual *S. wetlandicus* within the action area (approximately 5,600 plants) and 1 percent of the total estimated population of *S. wetlandicus*. This number is an underestimate of the number of individuals on non-federal lands because surveys are not always required or conducted on private, state, and tribal lands. *S. wetlandicus* individuals on non-federal lands will be negatively impacted by landscape-scale factors (habitat fragmentation, increased dust, and so on) due to cumulative impacts in the action area.

Colorado Pikeminnow, Razorback Sucker, Humpback Chub, and Bonytail

Reasonably foreseeable future activities that may affect river-related resources in the area include oil and gas exploration and development, fire management, irrigation, recreational activities, Central Utah Project, Colorado River Salinity Control Project, and activities associated with the Upper Colorado River Endangered Fish Recovery Program. Implementation of these projects affects the environment including but not limited to water quality, water rights, socioeconomic factors and wildlife resources.

Cumulative effects to this species include the following types of impacts:

- Changes in land use patterns that will further fragment, modify, or destroy potential spawning sites or designated critical habitat;
- Shoreline recreational activities and encroachment of human development that will 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;
- Additional water depletions to the Upper Colorado River Basin.

VI. CONCLUSION

After reviewing the current status of *Sclerocactus wetlandicus* and the four federally endangered fishes of the Upper Colorado River Basin, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that this project, as described in this biological opinion, is not likely to jeopardize the continued existence of *S. wetlandicus* or the four endangered fishes. The proposed project is also not likely to destroy or adversely modify designated critical habitat. We base our conclusion on the following:

- Although approximately 11 percent of the known population of *Sclerocactus wetlandicus* occurs in the action area, we expect minimal additional surface disturbance because approximately 60 percent of the proposed new wells will be drilled from existing well pads. The remaining wells, 40 percent, will be developed on new well pads (and thus new surface disturbance); at most, 15 will be developed across level 1 and level 2 core conservation areas. New surface disturbance from these 15 well pads will contribute 0.3 percent to total surface disturbance within the core conservation areas. Although our recommended disturbance threshold in core conservation areas is already exceeded, the commitment to additional conservation measures will minimize additional impacts from these additional well pads (Table 1).
- Applicant committed conservation measures and mitigation measures previously stated in this biological opinion will minimize direct impacts to listed species.
- The existence of the Upper Colorado River Endangered Fish Recovery Program and the sufficient progress of recovery activities to date.

We recognize that the person who depletes and the amount of water they deplete may vary from year to year. Consequently, water users assume the risk that the future development of senior water rights, including Tribal water rights, may result in shortages of water to junior users. Nothing in this biological opinion precludes any new depletion that results from the exercise of senior water rights within the project area.

VII. INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR § 17.3). Harass is defined by the Service as intentional or negligent 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). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental

Take Statement.

The measures described below are non-discretionary, and must be undertaken by the BLM so that they become binding conditions of any grant or permit issued to KMG for the exemption in section 7(o)(2) to apply. The BLM has a continuing duty to regulate the activity covered by this incidental take statement. If the BLM (1) fails to assume and implement the terms and conditions or (2) fails to require KMG to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, either BLM or KMG must report the progress of the action and its impact on the species to us as specified in the incidental take statement. [50 CFR § 402.14(i)(3)]

We have developed the following incidental take statement based on the premise that the applicant-committed conservation measures will be implemented.

AMOUNT OR EXTENT OF TAKE ANTICIPATED

We anticipate that all age classes of Colorado pikeminnow, humpback chub, razorback sucker, and bonytail could be taken from within the Upper Colorado River Basin as result of the proposed action. However, Colorado pikeminnow and razorback sucker are more likely to be impacted due to their presence in segments of the White River within the project area. Incidental take is expected to be in the form of harm (death or injury) due to accidental contamination from leaks/spills during project related activities of project area streams and washes that are tributaries to the White River.

Based on estimates from surveys conducted by UDWR and the Service of federally listed fish abundance per river segment (Bestgen *et al.* 2010), we anticipate a combined total of 7 Colorado pikeminnow and razorback sucker, could be lethally taken as a result of habitat lost through contamination of backwater areas located within 1.0 river mile downstream of the confluence of project area washes and White River. Incidental take of actual species numbers may be difficult to detect because finding a dead or impaired specimen is unlikely.

Based on the above information, we authorize: a total combined lethal take of 7 fish for Colorado pikeminnow and razorback sucker; take of habitat not to exceed 1.0 river miles from the confluence of project area washes and the confluence of the White River; and all take in the form of harm that will occur from the removal of 757 acre-feet of water per year during the first 5 years with a peak depletion of 757 acre-feet.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal, reduction or possession of federally listed plants; the malicious damage of such plants on areas under Federal jurisdiction; the destruction of federally listed plants on non-Federal areas in violation of States law or regulation; or in the course of any violation of a State criminal trespass law.

EFFECT OF THE TAKE

In the accompanying biological opinion, we determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

We believe that the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of the Colorado pikeminnow, humpback chub, razorback sucker, and bonytail:

1. Conduct all proposed actions in a manner that will minimize all impacts to listed endangered fish species and their designated critical habitat

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, BLM and KMG must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following terms and conditions are assumed to include all previously listed applicant-committed environmental protection measures, but in some cases include more restrictive or more detailed measures. Conservation measures include implementing the Recovery Program (and relevant RIPRAP measures).

For Reasonable and Prudent Measure #1:

1. To ensure proper tracking of water depletions from the Upper Colorado River System, KMG will notify the BLM and/or our office as to what water resources will be used for the project as they are designated, and the amounts that will be withdrawn from each one.

2. Coordinate with our office regarding design and placement of any structures that may need to be placed in washes or 100-year floodplains of tributaries to the White River and the White River itself.

3. Appropriate erosion control and revegetation measures will be employed. In areas with unstable soils where seeding alone may not adequately control erosion, grading will be used to minimize slopes and water bars will be installed on disturbed slopes. Erosion control efforts will be monitored by the operator and necessary modifications will be made to control erosion.

VIII. REPORTING REQUIREMENTS

In order to be exempt from the prohibitions of section 9 of the Act, the BLM must comply with all Recovery Program activities and the monitoring proposed below.

The implementing regulations for incidental take require that Federal agencies must report the progress of the action and its impact on the species (50 CFR 402.14(i)). To meet this mandate, the BLM will monitor and report the progress of their action as follows:

1. The BLM is required to submit to our office an annual report of water depletions associated with oil and gas development, including the following information:

    - Project name and/or applicant name
    - Permit number and/or special use authorization
    - General location and legal description
    - Depletion amount in acre-feet
    - Timing of depletion
    - Identify if new or historic depletion[1]
    - Sub-total water depletion (acre-feet) for each applicant
    - Total depletion for the entire year in acre-feet
    - Total number of APDs approved
    - Total number of wells spudded

Reports shall be due to our office on a yearly basis by October 31. The address for the Utah Fish and Wildlife Service Field Office is:

2369 West Orton Circle, Suite 50
West Valley City, Utah 84119

Any annual cactus monitoring reports associated with the proposed actions must be submitted to us and the BLM by January 31 each year following monitoring.

Upon locating dead, injured, or sick listed species, immediate notification must be made to the Service's Salt Lake City Field Office at (801) 975-3330 and the Service's Division of Law Enforcement, Ogden, Utah, at (801) 625-5570. Pertinent information including the date, time, location, and possible cause of injury or mortality of each species shall be recorded and provided to the Service. Instructions for proper care, handling, transport, and disposition of such specimens will be issued by the Service's Division of Law Enforcement. Care must be taken in handling sick or injured animals to ensure effective treatment and in handling dead specimens to preserve biological material in the best possible state.

IX. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to

[1] It is important to include information on whether each depletion is new or historic (occurring prior to January 1988), because we addresses new and historic depletions differently under the new section 7 agreement of March 11, 1993. Historic depletions, regardless of size, do not pay a depletion fee.

minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The applicant-committed measures and proposed mitigation measures address most of the impacts associated with water withdrawals from the White River, other impacts to waterways, and impacts to *Sclerocactus wetlandicus*. However, to ensure that Federal agencies can meet their requirements under Section 7(a)(1) and work toward recovery of listed species, we recommend the following measures in addition to applicant-committed conservation measures. The conservation recommendations below for *Sclerocactus wetlandicus* were adapted from the recent recovery outline.

Because the Recovery Program is already working toward recovery of the four Colorado River fish species, the conservation recommendations below are specific to this project and will help further the goals of the Recovery Program.

Sclerocactus wetlandicus

Surveys and Monitoring

- Completion of a comprehensive survey throughout *Sclerocactus wetlandicus'* range, including areas that are not likely to be disturbed. Survey results will provide an accurate population estimate and allow us to refine core population areas so we can more effectively protect the species. This effort will require evaluation of habitat components likely to support *S. wetlandicus*.
- More accurately delineate the range and morphology of *Sclerocactus wetlandicus* and potential varieties, especially in relationship to *S. brevispinus* and particularly in the hybrid zone.
- Locate possible connectivity corridors between *Sclerocactus* populations to better refine core conservation areas.
- All Federal agencies and land-owners—including the BIA, Ute Tribe, Bureau of Land Management (BLM) and our office—should work together to implement and fund the range-wide monitoring program for *Sclerocactus wetlandicus*. These data will improve our understanding of trends and allow us to adopt more effective conservation measures if cacti are being adversely impacted despite current conservation measures.

Threats Abatement

- Specific to this project, KMG, BLM, and BIA should avoid any new surface disturbance (including construction of any new wells) in core conservation areas and, if new surface disturbance is unavoidable, should work with us to minimize impacts in core conservation areas.
- When results from the enhanced reclamation study become available, KMG, BLM, and BIA should work with us to incorporate effective techniques into reclamation activities.
- Follow the same applicant-committed conservation measures across the project area regardless of land ownership.

- Identify cacti sites in urgent need of habitat protection, set protection priorities, and implement protective measures and special management considerations. For example, the BLM, BIA, Ute Tribe, and our office should work together to finalize core conservation areas where surface disturbance will be limited in order to preserve intact populations of cacti and open, unoccupied habitat.
- Oil and gas leasing and other mineral extraction activities should avoid occupied sites and other important habitat when possible.
- Implement standard conservation measures to minimize future project and use impacts. For example, proposed projects should use existing surface disturbance and rights-of-way to minimize additional surface disturbance and habitat fragmentation.
- Coordinate with land management agencies, project proponents, and other partners early in the planning process to limit direct and indirect impacts of planned activities.
- Install livestock exclosures for protection and monitoring purposes in locations that will not be prone to illegal collection.
- Prevent the collection of *Sclerocactus wetlandicus* plants from natural populations. With respect to this project, KMG employees should notify us or the BLM immediately if they observe suspicious behavior—such as non-federal or non-project-related personnel looking for plants—in areas with known cactus locations.
- For infrastructure (typically, a pipeline) that crosses through occupied cactus habitat, applicants should ensure that future maintenance activities will not impact cacti. This can be accomplished by some or all of the following:
    - Notify maintenance crews when they will be working in a sensitive cactus area and provide them with GPS information or maps of areas to avoid,
    - Have a botanist on site prior to and during maintenance activities to flag cacti or avoidance areas and remove the flags immediately after work has completed, and
    - Install protective fencing (e.g., silt fencing) around cacti that are downslope or downwind of surface-disturbing maintenance activities during maintenance, and remove the fencing immediately work is completed.
- We recommend that KMG apply the same conservation measures that they practice on federal lands across all of their project areas that contain *S. wetlandicus* habitat.

Research

- Continue research into *Sclerocactus wetlandicus* life history and ecology, including soil requirements and pollinators.
- Study population dynamics and conduct a population viability analysis.
- Encourage investigations that project *Sclerocactus wetlandicus'* vulnerability and response to climate change.
- Coordinate with *Sclerocactus* genetic and taxonomic experts to resolve the genetics of *S. wetlandicus* outlier populations and the boundaries between *S. brevispinus*, *S. wetlandicus*, and *S. parviflorus*.
- Establish effective, science-based reclamation techniques for disturbed habitat.
- Improve our understanding of livestock and native (e.g., rodent) grazing impacts.
- Monitor *Moneilema semipunctatum* (cactus borer beetle) infestations, and study the relationship of episodic infestations with drought and other environmental factors.

- Monitor changes in invasive species prevalence and impacts on *Sclerocactus wetlandicus*. Additionally, continue to explore approaches to minimize the risk posed by invasives and associated remediation actions.

Four Colorado River Fish Species

Threats Abatement

- Employ closed-loop drilling methods for drilling and completion activities within all designated 100-year floodplains. This will apply to both new construction and expansion of existing facilities.
- Machinery should be fueled outside of all stream channels to prevent spillage into waterways;

Research

Fish sampling surveys in the last 20 years have demonstrated widespread mercury contamination (in the form of methyl mercury), especially in the freshwater systems of the northern hemisphere. Fish accumulate methyl mercury mostly from their diet; therefore, mercury concentrations in fish tissue generally increase with increasing age or body size. Also, mercury biomagnifies in aquatic food-chains; therefore, fish at higher trophic levels usually contain greater mercury concentrations than coexisting species at lower trophic levels. The effects of mercury accumulation on fish species includes lower reproduction (reduced hatching, development, and survival of eggs), altered behavior (reduced predator avoidance and forage ability), and altered hormone production.

Large bodied fish species of the White river, including Colorado pikeminnow, are susceptible to mercury contamination because they are piscivorous and long-lived. In fact, a 2003 study designed to investigate environmental contaminants and their effects on fish in the Colorado River Basin demonstrated that mercury concentrations were elevated in some fish collected from the Yampa River at Lay, Colorado, and the Green River at Ouray National Wildlife Refuge in Utah.

Recently, researchers have begun testing large-bodied fish in the White river for mercury concentrations using muscle biopsies–a non-lethal form of data collection. Increased knowledge about mercury content in these fish species will help guide recovery efforts by indicating if mercury pollution is an issue of primary importance. Currently, we have muscle plug collections in deep freeze storage that have yet to be analyzed for mercury content.

- We recommend that the project applicant fund the analysis of these muscle plugs, assisting our office in a key research component. To analyze our existing samples will cost approximately $1,500.

For us to stay informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

X. REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action outlined in your request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action was retained (or is authorized by law) and if: (1) the average annual water withdrawals out of the Upper Colorado River Drainage System exceed the estimated 757 acre-feet by more than 10 percent; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) 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; or (4) a new species is listed or critical habitat designated that may be affected by the action. If cactus core conservation areas are approved and/or modified in the future by the Service, re-initiation of consultation for the Greater Natural Buttes project would not be necessary. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We appreciate your commitment in the conservation of endangered species. If the project changes or it is later determined that the project affects listed species differently than identified above; it may become necessary to reinitiate section 7 consultation. If you require further assistance or have any questions, please contact Jessi Brunson at (435) 781-4448 or Scott Ackerman, at (435) 781-4437.

bcc: Project file
Reading file

ACKERMAN/cmh:1/27/12
File Location: Energy/BLM/Anadarko
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Appendix *M*
BLM and USFWS Clay Reed-mustard and Uinta Basin Hookless Cactus Conservation Measures

Appendix *M*

BLM and USFWS Clay Reed-mustard and Uinta Basin Hookless Cactus Conservation Measures

Clay reed-mustard (*Schoencrambe argillacea*)

In order to minimize effects to the federally threatened clay reed-mustard, the Bureau of Land Management (BLM) in coordination with the U.S. Fish and Wildlife Service (USFWS) developed the following avoidance and minimization measures. Integration of and adherence to these measures will help ensure the activities carried out during oil and gas development (including but not limited to drilling, production, and maintenance) are in compliance with the Endangered Species Act (ESA). The following avoidance and minimization measures should be included in the Plan of Development:

1. Pre-project habitat assessments will be completed across 100 percent of the project disturbance area within potential habitat[1] prior to any ground disturbing activities to determine if suitable clay reed-mustard habitat is present.
2. Site inventories will be conducted within suitable habitat[2] to determine occupancy. Where standard surveys are technically infeasible and otherwise hazardous due to topography, slope, etc., suitable habitat will be assessed and mapped for avoidance (hereafter, "avoidance areas"); in such cases, in general, 300-foot buffers will be maintained between surface disturbance and avoidance areas. However, site-specific distances will need to be approved by the USFWS and the BLM when disturbance will occur upslope of habitat. Where conditions allow, inventories:
    a. Must be conducted by qualified individual(s) and according to the BLM and the USFWS accepted survey protocols;
    b. Will be conducted in suitable and occupied[3] habitat for all areas proposed for surface disturbance prior to initiation of project activities and within the same growing season, at a time when the plant can be detected (usually May 1 to June 5, in the Uinta Basin; however, surveyors should verify that the plant is flowering by contacting a BLM or USFWS botanist or demonstrating that the nearest known population is in flower);
    c. Will occur within 300 feet from the centerline of the proposed right-of-way for surface pipelines or roads; and within 300 feet from the perimeter of disturbance for the proposed well pad including the well pad;
    d. Will include, but not be limited to, plant species lists and habitat characteristics; and
    e. Will be valid until May 1 the following year.
3. Design project infrastructure to minimize impacts within suitable habitat[2]:
    a. Where standard surveys are technically infeasible, infrastructure and activities will avoid all suitable habitat (avoidance areas) and incorporate 300-foot buffers, in general; however, site-specific distances will need to be approved by the USFWS and the BLM when disturbance will occur upslope of habitat;
    b. Reduce well pad size to the minimum needed, without compromising safety;

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[1] *Potential habitat* is defined as areas that satisfy the broad criteria of the species habitat description; usually determined by preliminary, in-house assessment.

[2] *Suitable habitat* is defined as areas that contain or exhibit the specific components or constituents necessary for plant persistence; determined by field inspection and/or surveys; may or may not contain clay reed-mustard; habitat descriptions can be found in Federal Register Notice and species recovery plan links at <http://www.fws.gov/endangered/wildlife.html>.

[3] *Occupied habitat* is defined as areas currently or historically known to support clay reed-mustard; synonymous with "known habitat."

c. Limit new access routes created by the project;

d. Roads and utilities should share common rights-of-way where possible;

e. Reduce the width of rights-of-way and minimize the depth of excavation needed for the road bed; where feasible, use the natural ground surface for the road within habitat;

f. Place signing to limit off-road travel in sensitive areas; and

g. Stay on designated routes and other cleared/approved areas.

4. Within occupied habitat,[3] project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants:

   a. Where standard surveys are technically infeasible, infrastructure and activities will avoid all suitable habitat (avoidance areas) and incorporate 300-foot buffers, in general; however, site-specific distances will need to be approved by the USFWS and the BLM when disturbance will occur upslope of habitat;

   b. Follow the above recommendations (#3) for project design within suitable habitats;

   c. To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices will be incorporated into the project design; appropriate placement of fill is encouraged;

   d. Construction of roads will occur such that the edge of the right-of-way is at least 300 feet from any plant and 300 feet from avoidance areas;

   e. Roads will be graveled within occupied habitat; the operator is encouraged to apply water for dust abatement to such areas from May 1 to June 5 (flowering period); dust abatement applications will be comprised of water only;

   f. The edge of the well pad should be located at least 300 feet away from plants and avoidance areas, in general; however, site-specific distances will need to be approved by the USFWS and the BLM when disturbance will occur upslope of habitat;

   g. Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the right-of-way and plants and 300 feet between the edge of right-of-way and avoidance areas; use stabilizing and anchoring techniques when the pipeline crosses suitable habitat to ensure pipelines don't move towards the population; site-specific distances will need to be approved by the USFWS and the BLM when disturbance will occur upslope of habitat;

   h. Construction activities will not occur from May 1 through June 5 within occupied habitat;

   i. Before and during construction, areas for avoidance should be visually identifiable in the field, e.g., flagging, temporary fencing, rebar, etc.;

   j. Where technically and economically feasible, use directional drilling or multiple wells from the same pad;

   k. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat; and

   l. Minimize the disturbed area of producing well locations through interim and final reclamation. Reclaim well pads following drilling to the smallest area possible.

5. Occupied clay reed-mustard habitats within 300 feet of the edge of the surface pipelines' rights-of-way, 300 feet of the edge of the roads' rights-of-way, and 300 feet from the edge of the well pad shall be monitored for a period of 3 years after ground disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the BLM and the USFWS. To ensure desired results are being achieved, minimization measures will be evaluated and may be changed after a thorough review of

the monitoring results and annual reports during annual meetings between the BLM and the USFWS.

6. Reinitiation of Section 7 consultation with the USFWS will be sought immediately if any loss of plants or occupied habitat for the shrubby reed-mustard is anticipated as a result of project activities.

Additional site-specific measures also may be employed to avoid or minimize effects to the species. These additional measures will be developed and implemented in consultation with the USFWS to ensure continued compliance with the ESA.

Uinta Basin hookless cactus (*Sclerocactus glaucus (= brevispinus* and *wetlandicus*)

The following avoidance and minimization measures have been developed to assess impacts to the Uinta Basin hookless cactus. In order to minimize effects to the federally threatened Uinta Basin hookless cactus, the BLM in coordination with the USFWS developed the following avoidance and minimization measures. Integration of and adherence to these measures would help ensure the activities carried out during oil and gas development (including but not limited to drilling, production, and maintenance) are in compliance with the ESA. The following avoidance and minimization measures should be included in the POD:

1. ***Pre-project habitat assessments would be completed across 100 percent of the project disturbance area within potential habitat[4] prior to any ground disturbing activities to determine if suitable Uinta Basin hookless cactus habitat is present.***
2. ***Within suitable habitat,[5] site inventories would be conducted to determine occupancy. Inventories:***
    a. ***Must be conducted by qualified individual(s) and according to the BLM and USFWS accepted survey protocols.***
    b. ***Would be conducted in suitable and occupied[6] habitat for all areas proposed for surface disturbance prior to initiation of project activities and within the same growing season, at a time when the plant can be detected, and during appropriate flowering periods:***
        i. ***Sclerocactus brevispinus surveys should be conducted March 15 to June 30, unless extended by the BLM.***
        ii. ***Sclerocactus wetlandicus surveys can be done any time of the year, provided there is no snow cover.***
    c. ***Would occur within 300 feet from the edge of the proposed ROW for surface pipelines or roads; and within 300 feet from the perimeter of disturbance for the proposed well pad including the well pad.***

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[4] ***Potential habitat is defined as areas that satisfy the broad criteria of the species habitat description; usually determined by preliminary, in-house assessment.***

[5] ***Suitable habitat is defined as areas that contain or exhibit the specific components or constituents necessary for plant persistence; determined by field inspection and/or surveys; may or may not contain Uinta Basin hookless cactus. Habitat descriptions can be found in the U.S. Fish and Wildlife Service's 1990 Recovery Plan and Federal Register Notices for the Uinta Basin hookless cactus (http://www.fws.gov/endangered/wildlife.html).***

[6] ***Occupied habitat is defined as areas currently or historically known to support Uinta Basin hookless cactus; synonymous with "known habitat."***

d. Would include, but not be limited to, plant species lists and habitat characteristics; and

e. Would be valid until March 15 the following year for Sclerocactus brevispinus and 1 year from the survey date for Sclerocactus wetlandicus.

3. Design project infrastructure to minimize impacts within suitable habitat:

a. Reduce well pad size to the minimum needed, without compromising safety;

b. Limit new access routes created by the project;

c. Roads and utilities should share common ROWs where possible;

d. Reduce width of ROW and minimize the depth of excavation needed for the road bed; where feasible, use the natural ground surface for the road within habitat;

e. Place signing to limit off-road travel in sensitive areas;

f. Stay on designated routes and other cleared/approved areas; and

g. All disturbed areas would be re-vegetated with native species comprised of species indigenous to the area and non-native species that are not likely to invade other areas.

4. Within occupied habitat, project infrastructure would be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants:

a. Follow the above (#3) recommendations for project design within suitable habitats;

b. Buffers of 300 feet minimum between the edge of the ROW (roads and surface pipelines) or surface disturbance (well pads) and plants and populations would be incorporated;

c. Surface pipelines would be laid such that a 300-foot buffer exists between the edge of the ROW and the plants, use stabilizing and anchoring techniques when the pipeline crosses the habitat to ensure the pipelines don't move towards the population;

d. Before and during construction, areas for avoidance should be visually identifiable in the field (e.g., flagging, temporary fencing, rebar, etc.);

e. Where technically and economically feasible, use directional drilling or multiple wells from the same pad;

f. Designs would avoid concentrating water flows or sediments into occupied habitat;

g. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat; and

h. Minimize the disturbed area of producing well locations through interim and final reclamation. Reclaim well pads following drilling to the smallest area possible.

5. Occupied Uinta Basin hookless cactus habitats within 300 feet of the edge of the surface pipelines' ROW, 300 feet of the edge of the roads' ROW, and 300 feet from the edge of the well pad shall be monitored for a period of 3 years after ground disturbing activities. Monitoring would include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the BLM and the USFWS. To ensure desired results are being achieved, minimization measures would be evaluated and

may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the USFWS.

6. ***Re-initiation of Section 7 consultation with the USFWS would be sought immediately if any loss of plants or occupied habitat for the Uinta Basin hookless cactus is anticipated as a result of project activities.***

Additional measures to avoid or minimize effects to the species may be developed and implemented in consultation with the USFWS to ensure compliance with the ESA.

Appendix *N*
Graham's Beardtongue Conservation Measures

Appendix *N*

Recommended Measures to Avoid and Minimize Impacts to *Penstemon grahamii* from ongoing Oil and Gas Development (Appendix 1 from the Graham's Beardtongue Conservation Agreement)

These conservation measures are specific to traditional oil and gas energy development. Measures relevant to oil shale and tar sand development will be developed at a later date as definitive biological information concerning *P. grahamii* becomes available and the nature of the impacts of tar sand and oil shale energy developments become better known.

1. Pre-project habitat assessments will be completed across 100% of the project disturbance area within potential habitat prior to any ground disturbing activities to determine if suitable Graham's beardtongue habitat is present.

2. Within suitable habitat, site inventories will be conducted to determine occupancy. Inventories:
    a. Must be conducted by qualified individual(s) and according to BLM and Service accepted survey protocols,
    b. Will be conducted in suitable and occupied habitat[4] for all areas proposed for surface disturbance prior to initiation of project activities and within the same growing season, at a time when the plant can be detected (usually April 15th to May 20th in the Uintah Basin; however, surveyors should verify that the plant is flowering by contacting a BLM or FWS botanist or demonstrating that the nearest known population is in flower),
    c. Will occur within 300' from the centerline of the proposed right-of-way for surface pipelines or roads; and within 300' from the perimeter of disturbance for the proposed well pad including the well pad,
    d. Will include, but not be limited to, plant species lists and habitat characteristics, and
    e. Will be valid until April 15th the following year.

3. Design project infrastructure to minimize impacts within suitable habitat[2]:
    a. Reduce well pad size to the minimum needed, without compromising safety,
    b. Limit new access routes created by the project,
    c. Roads and utilities should share common right-of-ways where possible,
    d. Reduce the width of right-of-ways and minimize the depth of excavation needed for the road bed; where feasible, use the natural ground surface for the road within habitat,
    e. Place signing to limit off-road travel in sensitive areas, and
    f. Stay on designated routes and other cleared/approved areas.

4. Within occupied habitat, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants:
    a. Follow the above (#3) recommendations for project design within suitable habitats,
    b. Construction of roads will occur such that the edge of the right of way is at least 300' from any plant,
    c. Roads will be graveled within occupied habitat; the operator is encouraged to apply water for dust abatement to such areas from April 15th to May 20th (flowering period); dust abatement applications will be comprised of water only,
    d. The edge of the well pad should be located at least 300' away from plants,
    e. Surface pipelines will be laid such that a 300 foot buffer exists between the edge of the right of way and the plants, use stabilizing and anchoring techniques when the pipeline crosses the habitat (exposed raw shale knolls and slopes derived from the Parachute Creek and Evacuation Creek members of the geologic Green River Formation) to ensure pipelines don't move towards the population,
    f. Construction activities will not occur from April 15th through May 30th within occupied habitat,
    g. Before and during construction, areas for avoidance should be visually identifiable in the field, e.g., flagging, temporary fencing, rebar, etc.,

h. Where technically and economically feasible, use directional drilling or multiple wells from the same pad,
i. Designs will avoid concentrating water flows or sediments into occupied habitat,
j. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat, and
k. Minimize the disturbed area of producing well locations through interim and final reclamation. Reclaim well pads following drilling to the smallest area possible.

5. Occupied Graham's beardtongue habitats within 300' of the edge of the surface pipelines' right-of-ways, 300' of the edge of the roads' right-of-ways, and 300' from the edge of well pads shall be monitored for a period of three years after ground disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the BLM and the Service. To ensure desired results are being achieved, minimization measures will be evaluated and may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the Service.