ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED ARIZONA STRIP FIELD OFFICE WATER DEVELOPMENT PROJECTS ON THE ARIZONA STRIP, MOHAVE AND COCONINO COUNTIES, ARIZONA (DOI-BLM-AZ-A010-2016-0027-EA)

Prepared by

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Chapter 1

INTRODUCTION

1.1 Background

The Arizona Strip Field Office of the Bureau of Land Management (BLM), along with C.A. Griffiths & Sons, Ray Spencer, RC Atkin Inc., Sunshine Cattle Co.,Gubler Ranch LLC, Foremaster Ranches LLC, and Devin Ruesch, the ranchers who hold the grazing permits, have been working cooperatively to improve grazing management, watershed conditions and rangeland health within the Gunsight, Grama Point, Mainstreet, Quail Canyon, Wolfhole Mountain, Flat Top Well, and Antelope Spring Allotments. An Allotment Management Plan (AMP) is in effect for all of these allotments. These AMPs identify the need for additional facilities and improved grazing management within each allotment.

For cooperative resource conservation, enhancement, and management objectives, construction of four water pipeline extensions (approximately 8.15 miles collectively) extending off existing water developments are proposed: one in the Flat Top Well Allotment, one in the Quail Canyon Allotment, and two in the Mainstreet Allotment. In addition, fourteen water catchments are proposed within the Gunsight, Grama Point, Mainstreet, Quail Canyon, Wolfhole Mountain, and Antelope Spring Allotments. The projects would be funded by the grazing permittees with possible additional funding by the Arizona Strip Grazing Board, Arizona Game and Fish Department (AGFD), and the Natural Resource Conservation Service (NRCS).

The Toquer Tank Allotment proposed water catchment apron project has been removed from the analysis of this environmental assessment (EA). The proposed catchment apron would have affected approximately one acre of designated critical habitat for Fickeisen plains cactus. The apron would have covered up soil and native vegetation that serves to protect the soil and provides habitat for pollinators, causing a direct loss of that acre of critical habitat. The BLM is reassessing the need for this project, and is therefore not proceeding with analysis of the project at this time.

This EA has been prepared to disclose and analyze the environmental consequences of the proposed catchment and pipeline projects on the subject allotments. This analysis provides information as required by the BLM implementing regulations for the National Environmental Policy Act (NEPA), the Taylor Grazing Act, and the Federal Land Policy Management Act (FLPMA) to determine whether to authorize construction of these projects. This EA also serves as a tool to help the authorized officer make an informed decision that is in conformance with the Arizona Strip Field Office Resource Management Plan (RMP) (BLM 2008a). The EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or alternatives to the proposed action. The EA assists the BLM in project planning and ensuring compliance with the NEPA, and in making a determination as to whether any "significant" impacts could result from the analyzed actions. "Significance" is defined by NEPA and is found in the Code of Federal Regulations (CFR) at 40 CFR 1508.27. An EA provides

evidence for determining whether to prepare an environmental impact statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a decision record (DR) in accordance with 43 CFR 4160 may be signed for the EA approving the selected alternative. A DR, including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts (effects) beyond those already addressed in the Arizona Strip Field Office RMP (BLM 2008a).

1.2 Purpose and Need

Gunsight Allotment

The Gunsight Allotment contains 7,230 acres of public land. This allotment contains two pastures and is used seasonally in the winter/spring, in a rotation grazing system in conjunction with State land that is leased in Utah. There are several earthen reservoirs on the allotment, but they are unreliable as they depend on rainfall events in order to fill, lack in water storage capabilities, and leak due to the soils inability to retain water. Currently there is only one reliable water source on the allotment, provided by a catchment located in the north central portion of the allotment.

The BLM along with C.A. Griffiths & Sons, grazing permittees, have proposed to build a water catchment with trough on the south end of the allotment. This would create a new, reliable water source in the south pasture of the allotment which currently has unreliable earthen ponds. The addition of this water source would distribute livestock more evenly throughout the allotment and result in more uniform use across the pasture (while not exceeding the maximum utilization level of 50%). Wintering Kaibab mule deer rely heavily on the one existing water source in this allotment, so it is expected that the proposed additional water source would also benefit the mule deer population.

The land health evaluation for this allotment was completed in 2006; it was recommended by the interdisciplinary assessment team that the allotment was making significant progress toward meeting the applicable standards for rangeland health – the causal factor for not meeting was the high sagebrush composition in the allotment, resulting in a lack of species diversity. While this proposed water catchment was not specifically identified in the land health evaluation, additional water sources in general were identified as being needed – an additional water source would result in more uniform distribution of livestock and thus more even use within the pasture, which should benefit rangeland health.

Grama Point Allotment

The Grama Point Allotment consists of 23,265 acres, of which 320 acres are state lands. This allotment has two pastures and is used seasonally in the winter/spring. This allotment currently has two reliable water sources that come from catchments. Both of these catchments are located in the southern portion of the allotment, one in the Kanab Rim Pasture, and the other in the

Findley Tank Pasture. However, overall water distribution in both pastures is limited because all other sources for water are provided by earthen reservoirs and thus do not provide a dependable water source. This makes it difficult to remain on the current grazing cycle as outlined in the allotment management plan. (Please note that the Grama Point Allotment map in Appendix A shows a windmill, trough and several reservoirs in the same pasture as the proposed catchments; these facilities are all non-functional – they are very old, the reservoirs are completely silted in, the well has collapsed, and these water sources have not actually provided water for many years.)

The BLM, along with Ray Spencer grazing permittee, have proposed five water catchments with troughs on public lands which would provide additional water sources in both pastures of the allotment. This would provide reliable year-round water for wildlife, and would aid in keeping livestock dispersed throughout the pastures at all times within the grazing season, which would result in more uniform utilization of forage (while not exceeding the maximum utilization level of 50%). This would also give the permittee more reliability in adhering to the grazing system established in the AMP, and should benefit rangeland health (see Section 4.1.1 of this EA for further discussion on rangeland health).

The land health evaluation for this allotment was completed in 2008; it was recommended by the interdisciplinary assessment team that the allotment meets all applicable standards for rangeland health. While these proposed water catchments were not specifically identified in the land health evaluation, additional water sources in general were identified as being needed – additional water sources would result in more uniform distribution of livestock and thus more uniform utilization of forage, and thus more even use within each pasture, which should benefit rangeland health.

Mainstreet Allotment

The Mainstreet Allotment consists of 188,106 acres, of which 23,406 are state lands and 8,246 are private lands. The allotment is split into two main segments, a summer use area on the south and west portions of the allotment and a winter use area on the east side. Four pastures between the two segments serve as transition pastures from summer to winter ranges and vice versa.

The allotment is using a grazing system called the "best pasture" system. Each year the area being moved into is looked over by the BLM and the rancher to determine which pastures to use and in what sequence. This allows for flexibility while taking into consideration which pastures need deferment or rest.

The main sources of water on the Mainstreet Allotment are provided by large earthen ponds or reservoirs built along dry washes or drainages throughout the allotment. Although many of these ponds are strategically located throughout pastures for good distribution of livestock, they do not guarantee reliable water on an annual basis due to the unreliability of scattered summer rainfall events and capabilities of reservoir storage. This then makes it difficult for the permittee and the BLM to best plan and adhere to a grazing system. In an effort to more uniformly distribute livestock and therefore achieve more uniform utilization of key forage species, and give the permittee more reliable pasture use in this grazing system, four catchments with troughs, and two

pipelines running from existing catchments to troughs are proposed. This project is jointly proposed by Arizona Strip BLM and the grazing permittee, RC. Atkin, Inc. These water developments would also provide reliable water for wildlife.

The proposed Dutchman Catchment would service the Dutchman Pasture within the Mainstreet Allotment. This pasture was serviced by the Mustang Well, which in recent years has gone dry. This catchment would provide reliable water again for this pasture.

The second proposed project is called the Mudhole 2 Catchment project and is located in the Mudhole Pasture of the Mainstreet Allotment. This project would serve as a reliable source of water in this pasture, where currently none exist. It would also help pull cattle out of the valley bottoms to achieve more uniform distribution and utilization.

The third proposed project is called the Higley-Square Pond Catchment. This proposed catchment would be located in the Anthony's-Higley Pasture, and have three associated troughs to provide reliable water for three pastures within the Mainstreet Allotment. The three pastures serviced by this catchment would be Square Pond, the western side of Round Pond, and Anthony's Higley Pastures.

The fourth proposed project is called the Cecil-Round Pond Catchment. This catchment would be located in the Cecil Pasture. This catchment would provide reliable water to the eastern side of the allotment, including the Cecil Pasture and the Round Pond Pasture.

The fifth proposed project in the Mainstreet Allotment is the Hidden Hills Pipeline (aka Sheep Pockets Pipeline). This pipeline would run water from the existing Hidden Hills Catchment located in the Mainstreet Childers Pasture 1.05 miles to a trough that will be replacing an old water hauling ring tank located in the Mainstreet Doolittle Pasture.

The sixth and final proposed project in the Mainstreet Allotment is the Rim Catchment Pipeline (aka Pumphouse Catchement Pipeline) Extension. This pipe would run water from the existing Rim Catchment located in the Mainstreet Hidden Rim Pasture 1.50 miles to a trough located near the Rim Pond in the Mainstreet Engelstead Pasture.

The land health evaluation for this allotment was completed in 2005; it was recommended by the interdisciplinary assessment team that the allotment meets all applicable standards for rangeland health. While these proposed projects were not specifically identified in the land health evaluation, lack of reliable water for wildlife was identified as an issue. These projects would address this issue, and would also be beneficial to land health – reliable water sources would result in more uniform distribution of livestock use and thus more uniform forage utilization.

Quail Canyon Allotment

The Quail Canyon Allotment consists of 16,140 acres of which 160 acres are state lands. It is a year round allotment and uses a rotational grazing system. This allotment is a three pasture

allotment. Earthen reservoirs are the primary water source in the top north and top south pastures of the allotment. Earthen reservoirs are an unreliable water source year-round as they depend on rainfall events in order to fill, and lack in water storage capabilities.

The BLM, along with Sunshine Cattle Co., grazing permittee, have proposed a pipeline extension from the existing catchment to a new trough near an earthen reservoir which would create an additional water source in the northern portion of the allotment that would be available year-round for both livestock and wildlife use. They have also proposed two additional catchments; one of these would be in the north pasture, while the other would be in the south pasture, on the boundary of Quail Canyon and Wolfhole Mountain allotments, and would provide water to both allotments. (This second catchment is referred to as the Wolfhole Mountain Catchment in this EA.) These additional water sources would aid in keeping livestock dispersed throughout the allotment at all times of the grazing season, which would result in more uniform utilization of key forage species.

The land health evaluation for this allotment was completed in 2004; it was recommended by the interdisciplinary assessment team that the allotment is making significant progress toward meeting the applicable standards for rangeland health – the causal factor for not meeting was the high sagebrush and juniper composition in the allotment, resulting in a lack of understory species diversity. While this proposed pipeline extension and water catchments were not specifically identified in the land health evaluation, placement of new waters would be beneficial to land health – reliable water sources would result in more uniform distribution of livestock and thus more even use of forage.

Wolfhole Mountain Allotment

The Wolfhole Mountain Allotment consists of 14,266 acres of federal land. This allotment contains a single pasture and is used seasonally in the summer. There are several earthen reservoirs on the allotment, but they are unreliable as they depend on rainfall events in order to fill, lack in water storage capabilities, and leak due to the soils' inability to retain water. Currently there are no reliable water sources on the allotment.

The BLM, along with Gubler Ranches LLC., grazing permittee, have proposed a water catchment with two troughs on the boundary of (and shared by) the Quail Canyon and Wolfhole Mountain allotments (this catchment is referred to in this EA as the Wolfhole Mountain Catchment). One of the troughs would provide water to the south pasture of Quail Canyon Allotment (see above), while the other would provide water to the northern end of Wolfhole Mountain Allotment. Thus, more reliable water would be provided for these portions of each allotment. The new water catchment would provide reliable year-round water for both livestock and wildlife, and would aid in keeping livestock evenly dispersed throughout the pasture during periods of use, which would result in more uniform utilization of key forage species. It would also provide more stability to the current grazing cycle as outlined in the AMP, and allow the permittee to maintain this grazing system.

The land health evaluation for this allotment was completed in 2004; it was recommended by the

interdisciplinary assessment team that the allotment meets all applicable standards for rangeland health. This proposed water catchment was specifically identified in the land health evaluation; this would result in more uniform distribution of livestock and thus more uniform utilization of forage, which would aid in maintaining the desired plant community objectives across this allotment.

Flat Top Well Allotment

The Flat Top Well Allotment consists of 9,700 acres, of which 1,024 acres are State lands and is grazed seasonally in conjunction with other grazing allotments the operator has permits for. The allotment is divided into two pastures and uses a deferred rotational grazing system. There are several earthen reservoirs on the allotment, but they are unreliable as they depend on rainfall events in order to fill, lack in water storage capabilities, and leak due to the soils' inability to retain water. Currently there is only one reliable water source in the West Pasture of the allotment, provided by a pipeline that extends from a BLM well near Colorado City.

The BLM, along with Foremaster Ranches LLC., grazing permittee, have proposed to extend the existing waterline two miles south and place a new trough at the terminus of the pipeline extension. This would create a new water source in the southwestern part of the allotment which currently has no water. The addition of this water source would reduce impacts around the existing water trough on State Land and distribute livestock more evenly throughout the allotment. Pronghorn rely heavily on the existing water sources in this allotment, so it is expected that the proposed additional water source would also benefit the pronghorn population.

The land health evaluation for the Flat Top Well Allotment was completed in 2004; it was recommended by the interdisciplinary assessment team that the allotment meets all applicable standards for rangeland health. While this proposed pipeline extension was not identified in the land health evaluation, additional water would be beneficial to wildlife (the allotment is considered crucial range for pronghorn) and also to land health. The additional water source would reduce use at the area surrounding the existing water trough, while also promoting better livestock distribution, which would aid in maintaining the desired plant community objectives across this allotment.

Antelope Spring Allotment

The Antelope Spring Allotment consists of 17,620 acres, of which 1,920 acres are State lands, and 760 acres are private lands. This allotment is grazed year round, is divided into three pastures, and uses a deferred rotational grazing system. There are several earthen reservoirs on the allotment, but they are unreliable as they depend on rainfall events in order to fill, lack in water storage capabilities, and leak due to the soils' inability to retain water. Currently there are no reliable water sources in the Antelope Spring Pasture of the allotment.

In an effort to more uniformly distribute livestock and therefore achieve more uniform utilization of key forage species, and give the permittee more reliability for pasture use in this grazing system, two water catchments and a water storage project are being proposed for this allotment by

the BLM along with grazing permittee, Devin Ruesch. These waters would also provide reliable water for wildlife.
The proposed storage tank and associated trough would be near an existing spring. The spring produces approximately ½ gallon per minute; this is too little water to provide a reliable water source and keep cattle evenly distributed. However, on a long term basis, ½ gallon per minute equates to 262,800 gallons a year. This project would install a storage tank of up to 100,000 gallons near the spring, in order to store the water output of this spring.

Two catchments have also been proposed in the Antelope Spring Pasture. These additional water sources would aid in keeping livestock dispersed throughout the allotment at all times of the grazing season, which would result in more uniform utilization of key forage species. Pronghorn rely heavily on the existing water sources in this allotment, so it is expected that the proposed additional (reliable) water sources would also benefit the pronghorn population.

The land health evaluation for the Antelope Spring Allotment was completed in 2001; it was recommended by the interdisciplinary assessment team that the allotment meets all applicable standards for rangeland health. While these proposed water developments were not identified in the land health evaluation, additional water would be beneficial to wildlife and also to land health. Additional water sources would reduce use at the area surrounding the existing water sources, while also promoting better livestock distribution which would aid in maintaining the desired plant community objectives across this allotment.

Summary

The purpose of the proposed projects is not to increase permitted use, or animal unit months (AUMs), but to encourage and achieve better livestock distribution within the above mentioned BLM grazing allotments. The proposed projects would also provide additional water sources for wildlife (including mule deer and pronghorn). The *Arizona Strip Interdisciplinary Mule deer Management Plan 2015-2019*, which was developed jointly by the BLM and AGFD states that "water distribution should be improved in [Units 12B, 13A, and 13B] by utilizing both cooperative projects and wildlife catchments" (AGFD and BLM 2015). The *Arizona Statewide Pronghorn Management Plan* (AGFD 2009) identifies a number of management objectives, including objectives related to water availability. It should be noted that habitat management for non-listed, non-game species are typically provided in the form of supplemental benefits from actions designed to address other, targeted (i.e., threatened, endangered, candidate, or game species). These most often take the form of water developments or vegetative treatment projects. Thus, other wildlife species (along with mule deer and pronghorn) would benefit from the proposed water projects by improving water distribution and improving habitat use by these species as well, which are also objectives contained within the Arizona Strip Field Office RMP (BLM 2008a).

1.3 Conformance with Land Use Plan

The proposed action described in Chapter 2 is in conformance with the *Arizona Strip Field Office*

RMP, approved on January 29, 2008 (BLM 2008a). The proposed action is consistent with the following decisions contained within this plan.

The following decisions are from Table 2.3 in the RMP regarding Vegetation and Fuels Management:

- DFC-VM-04: Ecological processes and functions will be protected, enhanced, and/or restored by allowing tools that are necessary and appropriate to mitigate adverse impacts of allowable uses and undesirable disturbances, and contribute to meeting the Standards for Rangeland Health.

- MA-VM-14**:** Construction equipment, fire vehicles, and/or vehicles from outside the Arizona Strip Field Office used to implement authorized projects and/or uses, will be required to be cleaned (using air, low-pressure/high volume, or high-pressure water) prior to initiating the project. Vehicles leaving the area and later returning to continue the project will require re-cleaning.

The following decisions are from Table 2.4 in the RMP regarding Wildlife and Fish Management.

- DFC-WF-03: Forage, water, cover, and space will be available to wildlife of sufficient quality and quantity to support productive and diverse wildlife populations.

- DFC-WF-04: All waters will be safely available to wildlife.

- DFC-WF-12: Mule deer habitat will provide the necessary forage, water, cover, and shelter components for healthy, self-sustaining populations within the range of natural variability.

- DFC-WF-17: Water sources within mule deer habitat will be safely accessible to deer and other wildlife.

- DFC-WF-20: Pronghorn habitat will provide the necessary forage, water, cover, and shelter components for healthy, self-sustaining populations within the range of natural variability.

- DFC-WF-24: Water sources within pronghorn antelope habitat will be safely accessible to pronghorn and other wildlife.

It has also been determined that the proposed action would not conflict with other decisions throughout the plan.

1.4 Relationship to Statutes, Regulations, or Other Plans

This EA has been prepared in accordance with the requirements of NEPA and any additional Federal, State, and local statutes or laws that may be relevant to the proposed action, such as those cited below.

The proposed action is consistent with the Fundamentals of Rangeland Health (43 CFR 4180.1) and Arizona's Standards and Guidelines, which were developed through a collaborative process involving the Arizona Resource Advisory Council and the BLM State Standards and Guidelines Team. The Secretary of the Interior approved the Standards and Guidelines in April 1997. These standards and guidelines address watersheds, ecological condition, water quality, and habitat for sensitive species. These resources are addressed later in this document.

The proposed action is consistent with the *Arizona Strip Interdisciplinary Mule Deer Management Plan* (AGFD and BLM 2015), which states (on pages 10-11 of the plan) that "Perennial [water] sources are generally lacking, and man-made sources such as livestock tanks, water catchment facilities and spring developments provide the bulk of water sources available for mule deer. It has been demonstrated on the Arizona Strip that improving water distribution improves distribution and habitat use by mule deer and has positive impacts on populations."

The project areas are located in both Mohave County and Coconino County, Arizona. The proposed action is consistent with both county plans (*Mohave County General Plan* adopted September 1994 and revised December 5, 2005 and *Coconino County Comprehensive Plan* adopted September 2003). While the type of actions proposed in this EA is not specifically addressed in either of the County Plans, management of public lands is addressed. Mohave County's plan in Goal 12, Policy 12.1 (page 85) states in part: "Mohave County shall cooperate with those public agencies charged with managing properties in the public ownership, in order to achieve the goals of the County and these other agencies" (Mohave County 2005). Coconino County's plan in "Our vision for our future" under community partnerships (page 3) states in part: "We support good resource-management practices, a process that we facilitate by interacting with state, federal, and tribal agencies during the development of each other's plans and policies. Building on our successes, we create strategic partnerships to implement plans that enhance the values we cherish" (Coconino County 2003). The proposed action does not conflict with decisions contained within either of the plans.

In addition, the proposed action would comply with the following laws and/or agency regulations, other plans, and are consistent with applicable Federal, State and local laws, regulations, and plans to the maximum extent possible:

- Federal Land Policy and Management Act of 1976 (43 United States Code [USC] 1707 et seq.);
- Endangered Species Act of 1973 (ESA), as amended;
- Section 106 of the National Historic Preservation Act of 1966, as amended;
- Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001-3013; 104 Stat. 3048-3058); and

- Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds.

1.5 Identification of Issues

Identification of issues for this assessment was accomplished by considering the resources that could be affected by implementation of one of the alternatives. A summary of the issues and the rationale for analysis are given below.

- *Vegetation*: Disturbance to vegetation could occur during construction, including the potential loss of shrubs, grasses, and forbs along the footprint of the water catchment apron, fences, and pipelines. Maintenance could also result in minor trampling along the catchment apron fences and pipelines. However, providing new (and more reliable) waters would result in more uniform utilization of forage, which should aid in maintaining or achieving the desired plant composition objectives identified for each allotment.

- *Wildlife, Including Big Game Species, Migratory Birds, and Sensitive Species*: Disturbance to wildlife, including migratory birds and sensitive species, caused by noise and human presence could occur during construction. Long-term effects to wildlife could result from additional fence lines around aprons, loss of vegetation for food and cover, changes in livestock grazing patterns, and the addition of new reliable water sources.

- *Livestock Grazing*: The proposed water catchments with water troughs and storage tanks, and pipeline extensions would provide reliable sources of water being available at appropriate times for the grazing of livestock. This would help to improve the distribution of the livestock by having the waters scattered throughout the subject pastures, while enabling use of different portions of the pastures at different times, thus enhancing grazing systems identified in existing allotment management plans.

Chapter 2

PROPOSED ACTION AND ALTERNATIVES

This EA focuses on the proposed action and no action alternatives. The no action alternative is considered and analyzed to provide a baseline for comparing the impacts of the proposed action. One additional alternative was considered, but eliminated from further analysis. It is described in Section 2.3 along with rationale for not being further considered.

2.1 Alternative A - Proposed Action

Under this alternative, 14 new water catchments, one water storage tank, and associated troughs would be built and installed; the proposed action is to fence off approximately 2 acres for each catchment. Within the exclosure a water catchment apron would be constructed, up to 1½ acre in size; an 80 to 200 thousand gallon lined pond or storage tank would be constructed, and water would be piped from the apron to a tank or pond. An option included within this proposed action is either the construction of excavated ponds with flexible liners or large storage tanks. The location in which either the pond or storage tank would be constructed has been cleared for both cultural and special status species purposes. The excavated ponds with flexible liners are typically 8 – 10 feet deep and begin at ground level using heavy equipment. The slope ratio around the entire pond would be 1:1. It would then be lined with a plastic Firestone product called EPDM 45 mil. This plastic comes in approximately 50' widths and is bonded together using an adhesive. A fence would be constructed around the perimeter of the pond impeding animals from entering the storage pond so that they do not get trapped in the pond. If the storage tank option is chosen it would consist of a tank which would sit above ground approximately 15' tall. Either lids or wildlife escape ramps and floating bird ladders would be installed. Water from the pond or tank would then be piped to troughs and available to livestock and wildlife. The trough would be constructed using a heavy equipment sized tire and secured to the proposed location using concrete. Wildlife escape ramps would be secured in the trough before it is filled. No new structures would be placed around the trough. The construction of the storage tank for the spring would be the same as for catchments.

This alternative would also include four separate pipeline extensions in the Quail Canyon, Flat Top Well, and Mainstreet Allotments. These proposed pipeline extensions would consist of a high density polyethylene pipe buried 18 to 24 inches deep using a ripper tooth attached to a bulldozer. Each pipeline would be installed by driving a crawler tractor with the ripper tooth attached and lowered into the ground across the route of each pipeline. This would loosen the soil and allow for the pipe to be more easily installed as the tractor makes a second pass to install the pipeline. The pipeline would be installed along a 15-foot wide path; however, actual disturbance would only occur at the dozer tracks and a 12 to 16-inch point of impact from the ripper tooth. Troughs placed along these pipelines would be constructed using heavy equipment sized tires and secured to the proposed location using concrete. Wildlife escape ramps would be secured in each trough before it is filled. No other structures would be placed around these troughs.

The water sources for the proposed new troughs/pipelines and storage tank are:

- Quail Canyon Allotment – existing livestock catchment (fed by surface water from rainfall);
- Flat Top Well Allotment – existing well, to which permittee has water rights;
- Antelope Spring Allotment – Ruesch Spring, to which permittee has water rights;
- Mainstreet Allotment – existing Hidden Hills Catchment (aka Sheep Pockets) in Childers Pasture would be piped to existing water storage tank and replace an existing trough in

  Doolittle Pasture; existing Rim Catchment (aka Pumphouse Catchment) in Hidden Rim Pasture would be piped to a trough in Englestead Pasture.

These water sources are currently developed (i.e., they already exist); the proposed pipeline extensions, and storage tank would simply tap into these existing sources.

The proposed action includes future maintenance activities for the life of each project, which is expected to be at least 20-50 years. The exact maintenance requirements are not known but are expected to include annual inspections using all-terrain vehicles or pick-up trucks along the pipeline routes for minor repairs, as well as digging to find and repair leaks or clogs in the pipe.

Gunsight Allotment

The water catchment and trough proposed for this allotment would be located in the Lineshack Pasture. This project would serve as a reliable source of water in this pasture, where currently none exist. It would also help distribute cattle to the southern end of this pasture to achieve more uniform distribution and utilization. This catchment would be located along an existing road in the SW ¼, SE ¼ of T. 38N. R. 3 W., sec. 28 – no watering facility current exists at this location. See Appendix A (Gunsight Allotment map) for the location of the proposed water catchment and trough.

Grama Point Allotment

The water catchments proposed for this allotment would provide reliable water sources for both the Findley Tank and Kanab Rim Pastures, where currently earthen reservoirs and a well have proven to be unreliable sources of water in these pastures. Having reliable water sources in these pastures would help distribute cattle grazing evenly throughout the allotment and achieve more uniform utilization of forage. These catchments would be located in the following areas of the allotment. Catchment #1 would be located on the boundary of the two pastures, in the NE ¼ of T. 38 N. R. 4 W., sec. 12, and would provide water to both pastures; this location is 0.5 miles from an existing, unreliable earthen pond. Catchment #2 would be located in the SW ¼ of T. 38 N., R. 4 W., sec. 23, this location is 0.6 miles from an existing, unreliable earthen pond. Catchment #3 would be located in the SE ¼ of T. 38 N., R. 3 W., sec. 19, no watering facilities currently exist at this location. Catchment #4 would be located in the NE ¼ of T. 37 N., R. 3 W., sec. 18, this location is 0.15 miles from an existing, unreliable earthen pond. Catchment #5 would be located

in the SW ¼ of T. 38 N., R. 4 W., sec. 15; no watering facilities currently exist at this location. The water from these catchments would be available for wildlife yearlong. See Appendix A (Grama Point Allotment map) for the location of the proposed water catchments and troughs. See Table 2.1 for pasture location of each catchment.

Mainstreet Allotment

The proposed Dutchman Catchment and trough would service the Dutchman Pasture within the Mainstreet Allotment. This pasture was serviced by Mustang Well, which in recent years has gone dry. This catchment would provide reliable water again for this pasture. This catchment would be located in T. 38 N., R.11 W., sec. 19, NE¼SW¼, approximately a mile from one of the troughs previously serviced by Mustang Well.

The second proposed project is called the Mudhole 2 Catchment and trough and is located in the Mudhole Pasture of the Mainstreet Allotment. This project would provide a new and reliable source of water in the middle portion of this pasture. It would also help pull cattle out of the valley bottoms to achieve more uniform distribution and utilization. This catchment would be located in T. 37 N., R. 10 W., sec. 8, NW¼SW¼.

The third proposed project is called the Higley-Square Pond Catchment. This proposed catchment would have three associated troughs and would provide new and reliable water for three pastures within the Mainstreet Allotment. The three pastures serviced by this catchment would be Square Pond, the western side of Round Pond, and Anthony's Higley Pastures. The catchment would be located in T. 38 S., R. 10 W., sec. 24, SE¼SE¼, in the north-central part of Anthony's Higley Pasture, and a trough would be placed at the catchment site. A new pipeline would be constructed from the catchment, to provide water in two other pastures: one segment of this new pipeline would extend 0.61 miles north of the catchment to provide water to the Round Pond Pasture, while another pipeline segment would extend 0.54 miles northwest of the catchment to provide water to the Square Pond Pasture. A trough would be placed at the end of each of these pipeline segments.

The fourth proposed project is called the Round Pond Catchment. This catchment would be located in the Cecil Pasture, while the trough associated with the Higley-Square Pond Catchment described in the preceding paragraph would water the western part of this pasture. The Cecil-Round Pond Catchment would provide reliable water to the eastern side of the pasture. A pipeline would be constructed and a trough installed 0.45 miles west of the catchment to provide water to the Cecil and Round Pond Pastures. This catchment would be located in T 38 S., R 9 W., sec. 17, NW¼NW¼.

The fifth proposed project in the Mainstreet Allotment is the Hidden Hills Pipeline (aka Sheep Pockets Pipeline). This pipeline would run for 1.05 miles, along an existing road, from the existing Hidden Hills Catchment located in the Childers Pasture to a new trough located in the Doolittle Pasture. This pipeline would be located in T. 37 N., R.9 W., sec. 7, S½ and sec. 18, N½.

The sixth and final proposed project in the Mainstreet Allotment is the Rim Catchment Pipeline (aka Pumphouse Catchment Pipeline) Extension. This pipeline would run for 1.5 miles, along an existing road, from the existing Rim Catchment located in the Hidden Rim Pasture to a new trough located near the Rim Pond (an existing earthen pond) in the Engelstead Pasture. This pipeline would be located in T.36 N., R. 13 W., sec. 24; T. 36 N., R. 12 W., secs. 18 and 19.

See Appendix A, Mainstreet Allotment Maps, for the location of proposed water catchments, pipeline extensions, and troughs. See Table 2.1 for pasture locations of each proposed project.

Quail Canyon Allotment

The proposed Quail Canyon pipeline extension would begin at an existing livestock catchment and pipeline on public lands in the southwest corner of T. 40 N., R. 12 W. The pipeline would extend north for approximately two miles, along an existing road, where a new water trough would be placed at the end of the line, in the northeast corner of T. 40 N., R. 12 W., sec. 07 (near an unreliable earthen reservoir). This water would be available for wildlife yearlong.

The proposed new Quail Canyon Catchment site would provide a reliable water source for the Top North Pasture. It would be located next to an earthen reservoir which has proven to be an unreliable water source for this pasture. This catchment would be located in the SE ¼ of T. 40 N., R. 13 W., sec. 01. This water would also be available for wildlife yearlong. The proposed Wolfhole Mountain Catchment would provide water to both the north end of the Wolfhole Mountain Allotment (see following section), and the South Top Pasture of the Quail Canyon Allotment. The catchment would be placed .4 miles from an existing earthen reservoir that has proven to be an unreliable source of water for both of these allotments; one trough would be placed in the Quail Canyon Allotment, while the other would be placed in the Wolfhole Mountain Allotment. This catchment would be located in the SW¼ of T. 40 N., R. 12 W., sec. 32. This water would be available for wildlife yearlong. See Appendix A (Quail Canyon Allotment map) for the location of the proposed pipeline extension, catchments, and troughs. See Table 2.1 for pasture location of each project.

Wolfhole Mountain Allotment

The proposed Wolfhole Mountain Catchment and troughs would provide water to both the north end of the Wolfhole Mountain Allotment, and the South Top Pasture of the Quail Canyon Allotment (as described above). As previously stated, the catchment would be placed 0.4 miles from an existing earthen reservoir that has proven to be an unreliable source of water for both of these allotments. This catchment would be located in the SW¼ of T. 40 N., R. 12 W., sec. 32. This water would be available for wildlife yearlong. See Appendix A (Wolfhole Mountain Allotment map) for the location of the proposed catchment and troughs.

Flat Top Well Allotment

The Flat Top Well proposed pipeline extension would extend off the existing Hurricane Rim

pipeline at T. 39. N., R. 08 W., sec. 02, where it would extend south approximately two miles along an existing road, where a new water trough would be placed. The pipeline and trough would be located in T. 39 N., R. 08 W., sec. 15. This water would be available for wildlife yearlong. See Appendix A (Flat Top Well Allotment map) for the location of the proposed pipeline and troughs. See table 2.1 for pasture location of pipeline extension.

Antelope Spring Allotment

The water catchments proposed for this allotment would provide reliable water sources for the Antelope Spring Pasture, where currently earthen reservoirs have proven to be unreliable sources of water in this pasture. Having reliable water sources in this pasture would help distribute cattle grazing evenly throughout the allotment and achieve more uniform utilization of forage. Catchment # 1 would be located in the SE ¼ of T. 41N., R. 9 W., sec. 28, and would be a new water source for this part of the pasture. Catchment #2 would be located in the SW ¼ of T. 41 N., R. 10 W., sec. 26, and would be a new water source for this part of the pasture.

The Ruesch Spring Storage Tank Project would consist of installing a storage tank (of up to 100,000 gallons) and trough at the southwest corner of T.40 N., R. 10 W., sec. 01. Water is already present at this location (at a small seep to which the permittee has water rights), but occurs at such low quantity that it is an unreliable water source. Installing the storage tank would allow for water storage throughout the year and provide a reliable water source for wildlife year round and cattle during the short time they are in this pasture. See Appendix A (Antelope Spring Allotment map) for the location of the proposed catchments, troughs, and storage tank.

Table 2.1 lists each water development project, by allotment and pasture.

Table 2.1. List of Water Development Projects

Project Name	Pasture(s)
Gunsight catchment	Line Shack
Grama Point catchment 1	Findley Tank, Kanab Rim
Grama Point catchment 2	Findley Tank
Grama Point catchment 3	Kanab Rim
Grama Point catchment 4	Kanab Rim
Grama Point catchment 5	Findley Tank
Mainstreet Mudhole 2 catchment	Mudhole
Mainstreet Dutchman catchment	Dutchman
Mainstreet Round Pond catchment	Cecil, Round Pond
Mainstreet Higley catchment	Square Pond, Round Pond, Higley's
Mainstreet Englestead pipeline extension	Englestead
Mainstreet Hidden hills pipeline extension	Doolittle
Quail Canyon catchment	Top North

Quail Canyon pipeline extension	Top North
Wolfhole Mountain catchment	Wolfhole Mountain Pasture and Top South Pasture of Quail Canyon Allotment
Flat Top Well pipeline extension	West Pasture
Antelope Spring 1 catchment	Antelope Spring, Devin's Pasture
Antelope Spring 2 catchment	Antelope Spring
Ruesch Spring Storage Tank/ Antelope Spring	Antelope Spring

2.1.1 Best Management Practices

The following best management practices (BMPs) are included in the proposed action in an effort to minimize the impacts of the proposed action to social and natural environmental resources. The following are practices to be implemented for all of the proposed projects.

- Construction would be limited to daylight hours to minimize impacts to wildlife.

- Open trenches have the potential to trap and injure wildlife. During pipeline construction these risks would be mitigated by minimizing the length of time trenches are left open, providing escape avenues (lateral trenches) for wildlife when left overnight, and inspecting the trenches prior to backfill activities.

- Construction activities would be limited to periods when the soil and ground surface are not wet in order to avoid soil compaction.

- Soil disturbance associated with construction activities would be limited to the 15 foot wide route of each proposed project.

- Construction activities would be conducted in a manner that would minimize disturbance to existing vegetation by limiting vegetation thinning and restricting construction activities to a 15 foot wide path.

- During construction vehicular traffic would be restricted to existing roads and along the 15 foot wide route of each proposed project.

- All efforts would be made to conceal each pipeline route where it leaves an existing road. Concealment would include placement of natural materials to create barriers and masking the pipeline route so that it does not become a new public road.

- At no time would vehicle or equipment fluids (including motor oil and lubricants) be dumped on public lands. All accidental spills would be reported to the authorized officer and be cleaned up immediately, using best available practices and requirements of the law, and disposed of in an authorized disposal site. All spills of federally or state listed hazardous materials which exceed the reportable quantities would be promptly reported to

the appropriate agency and the authorized officer.

- Vehicles and equipment would be power washed off-site before construction activities begin to minimize the risk of spreading noxious weeds. This would include cleaning all equipment before entering the Arizona Strip. The project areas would be monitored by the BLM and permittees for noxious weeds for two years following completion of the project.

- The project sites would be cleaned up at the end of each day the work is being conducted (e.g., trash removed, scrap materials picked up); waste materials would be disposed of promptly at an appropriate waste disposal site. "Waste" means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment. "Waste" also includes the creation of micro-trash such as bottle caps, pull tabs, broken glass, cigarette butts, small plastic, food materials, bullets, bullet casings, etc. No micro-trash would be left at project sites to minimize the likelihood of condors visiting the site. BLM staff may conduct site visits to the area to ensure adequate clean-up measures are taken.

- Any cultural (historic/prehistoric site or object) or paleontological resource (fossil remains of plants or animals) discovered within the project areas would immediately be reported to the Arizona Strip Field Office Manager or her designee. All operations in the immediate area of the discovery shall be suspended until written authorization to proceed is issued. An evaluation of the discovery shall be made by a qualified archaeologist or paleontologist to determine appropriate actions to prevent the loss of significant cultural or scientifically important paleontological values.

- If in connection with this work any human remains, funerary objects, sacred objects, or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (Public Law 101-601; 104 Stat. 3048; 25 U.S.C. 3001) are discovered, operations in the immediate area of the discovery would stop, the remains and objects would be protected, and the Arizona Strip Field Office Manager (or her designee) would be immediately notified. The immediate area of the discovery would be protected until notified by the Arizona Strip Field Office Manager (or her designee) that operations may resume.

- The work crew chief must notify the BLM wildlife team lead at 435-688-3373 if California condors visit the worksite while construction is underway. Project activities would be modified or delayed where adverse effects to condors may result.

- If an active bird nest is found during construction in a location that would be adversely affected by operations at the site, the BLM wildlife team lead would be contacted to determine an alternative action.

- Any hollow metal and/or plastic (PVC) pipes and posts used or stored temporarily during construction or left permanently in place would be capped to prevent birds, small mammals, or reptiles from becoming entrapped.

- No hazing or harassment of wildlife is permitted.

- No smooth or barbed wire t-posts structures would be used to strengthen the integrity of the troughs to keep them from moving. Instead, heavy equipment sized tires would be secured using concrete. This would facilitate ingress and egress of wildlife, particularly bat species.

- Wildlife escape ramps would be secured in each trough before it is filled. Either lids or wildlife escape ramps and floating bird ladders would be installed to the storage tanks or ponds.

2.1.2 Monitoring

Monitoring under the proposed action would consist of a BLM staff member inspecting the project site during the construction phase of each project to ensure compliance with the BMPs listed in Section 2.1.1. Monitoring for the invasion of noxious weeds by BLM personnel would continue for a minimum of two years following completion of the project. The projects would be monitored on a yearly basis by the grazing permittees to ensure the water catchments, pipelines, troughs and storage tanks are functioning properly. In addition, rangeland monitoring (to evaluate compliance, utilization, composition, and long-term trend) would continue in these affected pastures and allotments which would help determine the effectiveness of the projects. This rangeland monitoring would also include inspections of the pipeline routes to determine if public use is occurring such that the routes are becoming new "roads" and therefore if additional mitigation (beyond concealment of the routes using natural materials as barriers) is necessary.

2.2 Alternative B - No Action

Under the no action alternative, the proposed water catchments, pipeline extensions and troughs would not be installed on BLM administered lands. Grazing would continue in the above mentioned allotments without the addition of any new rangeland improvement projects to promote better livestock distribution and more uniform utilization.

2.3 Alternatives Considered but Eliminated from Detailed Analysis

2.3.1 Construct Earthen Reservoirs

Under this alternative, earthen reservoirs would be constructed instead of installing water catchments, pipeline extensions and new water troughs. This would likely not result in reliable water sources due to the scattered, unreliable rainfall events that tend to occur on the Arizona Strip. Construction of reservoirs would also create a larger area of disturbance on vegetation and soil. The success of these reservoirs would be a risk regarding holding capabilities based upon

the soil type in which they would be built and the soil's inability to retain water. This alternative would therefore not address the purpose and need for action, and was thus not carried forward for detailed analysis.

CHAPTER 3

AFFECTED ENVIRONMENT

The purpose of this chapter is to describe the existing environment potentially affected by one of the alternatives in order to assist the reader in understanding the existing situation. The affected environment of this EA was considered and analyzed by an interdisciplinary team of resource specialists. Table 3.1 (following pages) addresses the elements and resources of concern considered in the development of this EA; this table indicates whether the element/resource is not present in the project area, present but not impacted to a degree that requires detailed analysis or present and potentially impacted. The resources identified and discussed in Section 3.2 of this EA include the relevant physical, social and biological conditions that may be impacted with implementation of the proposed action, and provides the baseline for comparison of impacts described in Chapter 4.

3.1 General Setting

The proposed pipeline extensions traverse approximately 8.15 miles of public land. The proposed water catchments and storage tank would consist of a total of approximately 30 acres of public land throughout the area administered by the Arizona Strip Field Office. The project areas are located in the Plains Grassland Ecological Zone, the Great Basin Ecological Zone, and the Forest Land Ecological Zone. The proposed projects lie outside of Grand Canyon-Parashant and Vermilion Cliffs national monuments.

3.2 Elements/Resources of the Human Environment

The BLM is required to consider many authorities when evaluating a Federal action. Those elements of the human environment that are subject to the requirements specified in statute, regulation, or executive order, and must be considered in all EAs (BLM 2008b) have been considered by BLM resource specialists to determine whether they would be potentially affected by the proposed action. These elements are identified in Table 3.1, along with the rationale for determination on potential effects. If any element was determined to potentially be impacted it was carried forward for detailed analysis in this EA. If an element is not present or would not be affected, it was not carried forward for analysis. Table 3.1 also contains other resources and elements that have been considered in this EA. As with the elements of the human environment, if these resources were determined to be potentially affected, they were carried forward for detailed analysis in this document.

Table 3.1. Elements/Resources of the Human Environment

NP = not present in the area impacted by any of the alternatives
NI = present, but not affected to a degree that detailed analysis is required
PI = present with potential for impact – analyzed in detail in the EA

Resource	Determination	Rationale for Determination
Air Quality	NI	The project areas are located in an area that is unclassified for all pollutants and has been designated as Prevention of Significant Deterioration Class II. Air quality in the area is generally good. Exceptions include short-term pollution (particulate matter) resulting from vehicular traffic on unpaved roads. Fugitive dust is also generated by winds blowing across the area, coming from roads and other disturbed areas. The proposed action would result in temporary, localized deterioration of air quality because of the operation of equipment, particularly the crawler tractor while installing the pipe. These emissions would be temporary and would cease once the pipelines, water troughs, storage tanks, catchments and enclosure fences are installed. Neither alternative would cause Class II standards to be exceeded. The alternatives would therefore not measurably impact air quality.
Areas of Critical Environmental Concern	NP	None of the proposed project areas are located within an Area of Critical Environmental Concern.
Environmental Justice	NI	The proposed action would have no disproportionately high or adverse human health or other environmental effects on minority or low income segments of the population. The proposed action would have no effect on low income and minority populations because none exist near the project areas.
Farmlands (Prime or Unique)	NP	There are no prime or unique farmlands within the project areas.
Floodplains	NI	No actions are proposed that would result in permanent fills or diversions, or affect the function of floodplains or special flood hazard areas.
Native American Religious Concerns	NI	The proposed action would not limit access to any ceremonial use of Indian sacred sites, or adversely affect the physical integrity of any such site. During coordination and consultation with the American Indian Tribes that claim cultural affiliation to northern Arizona, no Native American religious concerns have been identified in relation to the proposed action or in any of the project areas.
Threatened, Endangered or Candidate Plant	NI	Siler pincushion cactus (*Pediocactus sileri)* occurs in one very small population in the Flat Top Well Allotment, in the same pasture where the proposed project would occur. This

Resource	Determination	Rationale for Determination
Species		population occurs approximately one mile to the west of the proposed pipeline extension and trough. The pipeline would follow an existing road to minimize new disturbance. The proposed pipeline and trough would avoid this population and therefore would not directly affect this plant. It should also be noted that cattle already can access the area where improved livestock distribution is sought – the proposed project would simply ensure a reliable water source, not introduce grazing into an area where it has not previously occurred. While the population of *Pediocactus sileri* within the Flat Top Well Allotment is not regularly monitored, long term monitoring of other populations on the Arizona Strip has shown that this plant has been minimally affected by livestock and populations are instead influenced by timing and amount of precipitation received. For example, a plot located in the Atkin Well Allotment (outside any of the proposed project areas) is approximately 100 yards from an existing water and yearly monitoring has demonstrated trampling by livestock has only occurred on one cactus one time in this plot in 1994. It is therefore logical to conclude that the population in Flat Top Well Allotment would demonstrate similar lack of impacts from cattle trampling since the proposed trough would be located substantially further away from the cactus (one mile versus 100 yards). It has therefore been determined that the proposed pipeline extension and trough, while present in the same pasture as the plant population, would not affect this plant population. There are no other ESA-listed plant species, or designated critical habitat for these species, that occur in the project areas.
Threatened, Endangered or Candidate Animal Species	NI	The proposed project areas do not lie within any critical habitat that has been designated or proposed under the ESA for animal species. The California condor may occasionally fly over or feed in these allotments at any time of year. California condors are federally listed as endangered and a population of these condors was reintroduced on the Arizona Strip in 1996. This population is designated as experimental non-essential under Section 10(j) of the ESA. Condors are strictly scavengers and prefer to eat large, dead animals such as mule deer, elk, pronghorn, bighorn sheep, cattle, and horses. Condors range widely, easily covering over 100 miles in a day, and their current range includes the entire Arizona Strip. Although condors may either fly over or feed within the allotments, they have not been observed doing so. In addition, stipulations (i.e., best management practices) are incorporated into the proposed action (concerning site clean-up

Resource	Determination	Rationale for Determination
		and no harassment of wildlife) that would minimize the likelihood of impacts to condors. Thus, no effect to this species is expected from the proposed action. No other federally listed animal species are known or suspected to occur in or near any of the project areas.
Cultural Resources	NI	A BLM archaeologist conducted a Class III inventory of the proposed project areas. No cultural resources were encountered within any of the proposed project areas. If cultural resources are encountered during construction of the catchments and pipelines, routes would be altered to avoid impacting them. Cultural resources project files – BLM-010-2016-23; and BLM-010-2016-37 – contain documentation of compliance with Section 106 of the National Historic Preservation Act. Construction and use of the proposed range facilities would not affect any known cultural resources. No indirect impacts to historic properties are expected because the project areas are in gently rolling terrain with no potential for features that could be impacted by livestock (rock shelters, rock art or standing architecture). In addition, the project areas, and the allotments in which they occur, have been grazed for more than 150 years; during the period from approximately 1870 to 1934, hundreds of wild horses and thousands of sheep and cattle were allowed to indiscriminately graze and heavily use these areas. With passage of the Taylor Grazing Act (TGA) in 1934, livestock numbers and grazing areas (i.e., allotments) were first allocated and established. Current livestock numbers are substantially lower now than prior to passage of TGA. The proposed projects would not open up "new areas" to livestock use, but rather would distribute cattle more evenly across the various pastures for more uniform utilization. In the event that significant cultural resources are found to be adversely impacted due to construction and use of the proposed range facilities, preventative and mitigation measures would be determined on a site-specific basis, and then implemented.
Invasive, Non-native Species	NI	The invasive annual grass, *Bromus tectorum*, is common throughout the region. Cheatgrass is not on the Arizona Noxious Weed list. However it can be a very invasive non-native grass species. Proper range practices can help prevent the spread of undesirable plant species (Sheley 1995). Sprinkle et al (2007) found that grazing exclusion does not make vegetation more resistant to invasion by exotic annuals. Reasons for this may include: 1) grazing may result in a more diverse age classification of plants due to seed dispersal and

Resource	Determination	Rationale for Determination
		seed implementation by grazing herbivores, and 2) grazing removes senescent plant material, and if not extreme, helps open up the plant basal area to increase photosynthesis and rainfall harvesting (Holechek 1981). Loeser et al. (2007) reported that moderate grazing was superior to both grazing exclusion and high-impact grazing in maintaining plant diversity and in reducing exotic plant recruitment in a semiarid Arizona grassland. It is also important to note that removal of grazing by domestic livestock does not automatically lead to disappearance of cheatgrass (Young and Clements 2007). Proper grazing use which maintains stable plant communities (as is the case in the allotments – see discussion on rangeland health in Section 3.2.1.1 of this EA) should minimize or have no effect on the spread of cheatgrass and other invasive non-native species. ***Gunsight Allotment***: There are no known noxious weeds on this allotment. ***Grama Point Allotment***: There are no known noxious weeds on this allotment. ***Mainstreet Allotment***: A known population of Scotch thistle is found approximately 1.5 miles east of the closest proposed project. This population will continue to be monitored and treated as necessary. ***Quail Canyon Allotment***: A small population of Whitetop, and Halogeton are known to occur along the 1069 road which is 3 miles from the closest proposed project. These populations will continue to be monitored and treated as new plants emerge. ***Wolfhole Mountain Allotment***: A small population of Halogeton is found approximately three miles south of the proposed project. This population will continue to be monitored and treated as new plants emerge. ***Flat Top Well Allotment***: There are no known noxious weeds on this allotment. ***Antelope Spring Allotment***: There are no known noxious weeds on this allotment. ***Summary:*** We recognize that many things including livestock can be a

Resource	Determination	Rationale for Determination
		vector to spreading noxious weeds. However, through compliance inspections, utilization monitoring, long-term trend monitoring, site visits, cooperative weed management days, and discussions with permittees, new infestations are detected and treated while treating existing infestations. It is important to note that cattle already can access the areas where improved livestock distribution is sought – the purpose for the proposed projects is to distribute cattle more evenly across each subject pasture for more uniform utilization, rather than to allow livestock grazing to occur in "new areas" which have never before been available to livestock use. No discernible impacts from the proposed action are therefore anticipated.
Wastes (hazardous or solid)	NP	Measures to prevent the spillage of hazardous materials have been built into the proposed action (see Section 2.1.1). No hazardous materials issues are therefore anticipated.
Water Quality (drinking / ground)	NI	The proposed pipelines would carry water from springs, or catchments to livestock/wildlife drinking troughs or storage tanks. Each water source is already developed; the proposed catchments would be harvesting rain water and storing it until used by livestock or wildlife. This water would not be available for human consumption, and actions proposed in this EA would not alter the current situation, and therefore would not affect water quality.
Wetlands / Riparian Zones	NP	There are no wetlands/riparian zones in or near the project areas.
Wild and Scenic Rivers	NP	There are no river segments within the project areas that are designated, eligible, or suitable as wild, scenic, or recreational under the Wild and Scenic Rivers Act.
Wilderness	NP	The proposed projects are not located within designated wilderness.
Livestock Grazing	PI	The purpose of the proposed water developments is to provide more reliable waters in the affected pastures/allotments, which would result in more uniform distribution of livestock and utilization of forage throughout all the allotments involved in these projects. This issue is therefore analyzed in detail in this EA.
Woodland / Forestry	NI	Pinyon-juniper woodlands exist in the Quail Canyon and Wolfhole Mountain Allotments where the water catchment projects would occur. The pipeline follows roads in the Quail Canyon Allotment and would avoid pinyon-juniper trees. The proposed Wolfhole Mountain catchment would involve construction of a catchment through open-structure pinyon-juniper habitat. However, the proposed catchment would avoid trees wherever possible, so alteration of the forest structure

Resource	Determination	Rationale for Determination
		would not occur, other than potential removal of a few individual trees. Pinyon-juniper woodlands also exist on the Mainstreet allotment but none of the projects would be located in areas that have pinyon-juniper. The proposed action would therefore not affect the availability of, or access to, these resources.
Vegetation	PI	Impacts to vegetation at the sites of the proposed catchments and along the routes of the proposed pipelines would occur during installation of each proposed project. Some brush would be crushed as vehicles travel along the route and some plants would be torn up by the ripper tooth as the pipe is placed in the ground. This issue is therefore analyzed in detail in this EA.
BLM or State Sensitive Plant Species	NI	*Rosa stellata* occurs in three populations in the Grama Point Allotment, in the same pasture where the proposed projects would occur. These populations occur in the Timpoweap member of the Moenkopi Formation on the rim of Kanab Creek. However, the proposed catchments would be located in different soils, aspect, and topography than where this plant occurs and would completely avoid these populations. Installation of the catchments is designed to better distribute cattle in this allotment by providing reliable water sources. The proposed water catchments would be located in areas of existing disturbance – the proposed catchment nearest to where *Rosa stellata* occurs is at a site where range watering facilities already occur, although they are currently unreliable. It should also be noted that the populations of *Rosa stellata* occur on the edge of the canyon rim – areas not easily accessible to livestock – and the proposed projects would not change this situation (i.e., draw cattle to these areas). It has therefore been determined that the proposed water catchment projects, while present in the same allotment as these plant populations, would not affect this plant because it would not alter livestock movement patterns in the vicinity of where the plant occurs. There are no other sensitive plant species within or near any of the project areas.
Wildlife (including sensitive species and migratory birds)	PI	Short term impacts to wildlife could occur during construction and maintenance activities caused by noise, presence of humans, loss of vegetation for food and shelter, and destruction of burrows caused by the installation of the catchment and pipelines.
Soil Resources	NI	Construction of these water catchments and pipeline extensions would cause minimal disturbance to the soil resource (including biological soil crusts) – a total of approximately 43.7 acres would be directly disturbed (which is less than 0.04% of the

Resource	Determination	Rationale for Determination
		total area within each subject allotment). Passage of rubber tires and cleats from the crawler tractor could cause some temporary soil compaction. However, since construction activities would be limited to periods when the soil is dry, long term soil compaction in the project areas is not anticipated to occur. The ripper tooth would loosen soil along the route of the pipeline for a width of four inches to two feet. After one or two years the original vegetation would be regrown, which would protect soils from erosion. In addition, all of the troughs would be either located next to existing reservoirs or along existing roads, and all of the proposed pipeline locations would also be along existing roads, where disturbance to soils has already occurred. Thus, livestock concentration near water would also occur in areas where soil has already been disturbed. The grazing management systems for each allotment would continue to be followed, and with more reliable waters in the subject pastures, more uniform distribution and utilization would occur across the pastures, thus reducing long-term effects close to each water. Thus, impacts to soils would be minimal due to improving livestock distribution and reducing the potential overuse of the vegetative resource that provides soil cover and reduces potential erosion throughout the allotments and pastures.
Recreation	NI	Disturbance to the recreating public (including displacement of users) is unlikely as these areas are not popular destinations for tourists or the recreating public.
Visual Resources	NI	All of the proposed project areas are within Class III Visual Resource Management (VRM) areas except Antelope Spring Catchment #2 which falls within Class IV. The objective of Class III is to partially retain the existing character of the landscape with no more than moderate changes to the landscape. Management activities may attract attention but should not dominate the view of the casual observer. The objective of Class IV is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. However, every attempt should be made to minimize the impact of these activities through careful location, and minimal disturbance. Once the proposed projects are completed, a fence would be visible around each catchment apron, and the pipeline routes would be visible (due to the removal of vegetation) in the short-term, until vegetation becomes re-established. The 4-strand wire fence around each catchment apron and net wire fence around the storage pond

Resource	Determination	Rationale for Determination
		would not dominate the view of the casual observer, nor would the pipelines (in the long-term, once vegetation re-establishes) or water troughs. The projects would therefore meet VRM class III and IV objectives.
Geology / Mineral Resources / Energy Production	NI	The proposed action would not affect geology, mineral resources, or energy production as it would not close any areas to mineral development or alter any known geological feature.
Paleontology	NP	No paleontological resources are known to occur in the project areas.
Lands / Access	NI	Access to public lands would not be altered or impaired by implementation of the proposed action. No other lands issues have been identified in connection with the proposed action.
Fuels / Fire Management	NI	No hazardous fuel reduction or fuels management projects are proposed for the area. Installation of the catchments and pipelines would not affect fire management.
Socio-economic Values	NI	The economic base of the Arizona Strip is mainly ranching with a few gypsum/selenite and uranium mines. Nearby communities are supported by tourism (including outdoor recreation), construction, mining activities, and light industry. The social aspect involves remote, unpopulated settings with moderate to high opportunities for solitude. Construction of the proposed water developments would have little impact on the local economy or social aspect of the region since there would be no displacements or disruption to established businesses or uses of the area. Two or three people could receive short-term employment to install the catchments and pipelines. However, the proposed action would not affect the economy overall.
Wild Horses and Burros	NP	The proposed project areas are not within a wild horse or burro herd management areas, and no wild horses or burros occur within any of the allotments addressed in this EA.
Wilderness characteristics	NI	The proposed project areas are not located within any area containing the three wilderness characteristics of naturalness, opportunities for solitude, or outstanding opportunities for primitive and unconfined recreation, or within any area managed to maintain these wilderness characteristics.

3.3 Resources Brought Forward for Analysis

3.3.1 Vegetation

Two of the proposed projects in the Mainstreet Allotment as well as the proposed projects in the Flat Top Well and Grama Point Allotments are located within the Plains Grassland Ecological

Zone. Vegetation in this ecological zone consists of mostly open grassland composed of blue grama, black grama, galleta, Indian ricegrass, sand dropseed and various annual and perennial forbs. Shrubs scattered throughout the area include winterfat, shadscale, fourwing saltbush, Mormon tea, and spiny hopsage.

The proposed projects in the Quail Canyon, Gunsight, and Wolfhole Mountain allotments, as well as two Mainstreet Allotment projects are located within the Great Basin Ecological Zone (Sagebrush Communities). Vegetation in sagebrush communities of this ecological zone consists of shrub dominated communities, primarily Wyoming big sagebrush (although some scattered pinyon pine and juniper trees can also be present). A thriving community of native grasses and forbs occur within this zone as well, including galleta, Indian ricegrass, squirreltail and globemallow.

3.3.1.1 Land Health Evaluations

As previously described in Section 1.2 of this EA, land health evaluations have been completed for each of the allotments included in this EA analysis. Table 3.2 summarizes the land health evaluation determination recommended by the interdisciplinary assessment team for each allotment.

Table 3.2. Land Health Evaluation Determination

Allotment Name	Allot. #	Recommended Determination
Gunsight	5320	Making significant progress toward meeting.
Grama Point	5233	Met all applicable standards for rangeland health.
Mainstreet	4808	Met all applicable standards for rangeland health.
Quail Canyon	4856	Making significant progress toward meeting.
Wolfhole Mtn.	4839	Met all applicable standards for rangeland health.
Flat Top Well	5214	Met all applicable standards for rangeland health.
Antelope Spring	5210	Met all applicable standards for rangeland health.

Gunsight Allotment

The land health evaluation for this allotment was signed on May 19, 2006. The interdisciplinary team that prepared this evaluation report recommended that the allotment was making significant progress toward meeting the applicable standards for rangeland health. Standard 1 (Upland Sites) is being met; however, Standard 3 (Desired Resource Conditions) is not being met. The interdisciplinary team considered all monitoring data and determined that current livestock grazing was not the causal factor for not meeting desired resource conditions in the allotment, but instead it was due to the high composition of sagebrush and corresponding low composition of herbaceous species. The south side of the allotment is vegetated by near monocultures of

sagebrush and lacks diversity of vegetation. Ecological status data from the key areas shows that sagebrush ranges from 84 to 96 percent composition and squirreltail ranges from 2 to 10 percent composition. Long-term trend monitoring in conjunction with composition and utilization monitoring conducted since the evaluation document was signed reconfirm the 2006 land health evaluation determination.

Grama Point Allotment

The land health evaluation for this allotment was signed on December 12, 2008. It was recommended by the interdisciplinary assessment team that the allotment is meeting the applicable standards for rangeland health. The evaluation identified desired plant community objectives for the Grama Point Allotment and determined that these objectives are being achieved. Long-term trend monitoring in conjunction with composition and utilization monitoring conducted since the evaluation document was signed reconfirm the 2008 land health evaluation recommendation for this allotment.

Mainstreet Allotment

The land health evaluation for this allotment was signed on August 4, 2005. The interdisciplinary team that prepared this report recommended that the allotment met all applicable standards for rangeland health. The evaluation identified desired plant community objectives for the Mainstreet Allotment including the eight pastures where the proposed range improvement projects would be located, and determined that these objectives are being achieved. The proposed projects are located within the following pastures of the Mainstreet Allotment: Mudhole, Higley-S, Round Pond, Dutchman, Childers, Doolittle, Hidden Rim, and Englestead Pastures. Long-term trend monitoring in conjunction with composition and utilization monitoring conducted since the evaluation document was signed reconfirm the 2005 land health evaluation recommendation for this allotment.

Quail Canyon Allotment

The land health evaluation for this allotment was signed on September 30, 2004. It was recommended by the interdisciplinary assessment team that the allotment is making significant progress toward meeting the applicable standards for rangeland health – the causal factor for not meeting was the high sagebrush and juniper composition in the allotment, resulting in a lack of understory species diversity. The evaluation team recommended that the Top North and Top South pastures be placed in a fire prescription class which would allow any natural fires to burn themselves out rather than be suppressed, or plan a prescribed burn in order to reduce the amount of shrubs and trees (sagebrush and juniper) in the plant community and move the area toward meeting plant community objectives. The invasion of sagebrush, as well as pinyon and juniper, has been tied to decreases in species diversity. Long-term trend monitoring in conjunction with utilization monitoring reconfirm the 2004 land health evaluation recommendation for this allotment.

Wolfhole Mountain Allotment

The land health evaluation for this allotment was signed in September 7, 2004; it was recommended by the interdisciplinary assessment team that the allotment is meeting all applicable standards for rangeland health. The consensus of the team was that the allotment was in good ecological condition with good plant diversity. Management should consist of continuing the current practices, but allowing any natural fires starting in the Wolfhole Mountain pasture to burn in order to create openings in the pinyon and juniper and reduce impacts of a potentially closing canopy cover. The evaluation also recommended that a combination water catchment on the north end of the allotment be constructed to encourage more use on that end of the allotment, and providing a fresh water source for wildlife use. Long-term trend monitoring in conjunction with composition and utilization monitoring conducted at the key areas since the evaluation document was signed reconfirm the 2004 land health evaluation recommendation for this allotment.

Flat Top Well Allotment

The land health evaluation for this allotment was signed on May 3, 2004. The interdisciplinary team that prepared this evaluation report recommended that the allotment is meeting the applicable standards for rangeland health. The evaluation identified desired plant community objectives for the Flat Top Well Allotment and determined that these objectives are being achieved. Long-term trend monitoring in conjunction with composition and utilization monitoring conducted since the evaluation document was signed reconfirm the 2004 land health evaluation recommendation for this allotment.

Antelope Spring Allotment

The land health evaluation for this allotment was signed on October 12, 2001. The interdisciplinary team that prepared this evaluation report recommended that the allotment is meeting the applicable standards for rangeland health. The evaluation identified desired plant community objectives for the Antelope Spring Allotment and determined that these objectives are being achieved. Long-term trend monitoring in conjunction with composition and utilization monitoring conducted since the evaluation document was signed reconfirm the 2001 land health evaluation recommendation for this allotment.

3.3.2 Wildlife Including Big Game Species, Migratory Birds, and Sensitive Species

3.3.2.1 Big Game Species

Mule Deer (*Odocoileus hemionus*)

Mule deer can be found throughout most of the Arizona Strip. Concentrations occur on Black Rock and Poverty Mountains, on Mt. Trumbull, in the Buckskin Mountains, and in the Kanab

Creek area. Typical mule deer habitat is rough, steep canyons sparsely vegetated with brushy pockets that carve their way down through open grasslands. Mule deer often bed in juniper thickets or other shrubby areas.

AGFD has categorized habitat characteristics for mule deer within the state. Habitat categories are based on several factors such as topography, forage and cover, availability of water, and limiting factors such as prohibitive fencing. The Arizona Strip provides a mixture of year-round, winter, summer and limited habitat for mule deer. While this habitat model provides a good starting point for evaluating mule deer habitat conditions and predicting occupancy, mule deer could possibly be found within any of the proposed project sites at any time of year depending on localized water and forage availability which are subject to precipitation patterns. Habitat categories at each project location are listed in Table 3.3.

Table 3.3. Mule Deer Habitat Category at each Project Location

Project	Habitat Category
Gunsight	Winter Crucial
Grama Point 1	Winter Crucial
Grama Point 2	Winter Crucial
Grama Point 3	Limited
Grama Point 4	Limited
Grama Point 5	Winter Crucial
Mainstreet Mudhole 2	Yearlong
Mainstreet Dutchman	Yearlong
Mainstreet Round Pond	Limited
Mainstreet Higley	Limited
Quail Canyon 1	Yearlong
Wolfhole Mountain	Summer
Flat Top Well	Limited
Antelope Spring 1	Yearlong
Antelope Spring 2	Yearlong
Ruesch Spring Storage Tank	Yearlong

While no population estimates are available specifically for the project areas (population estimates are made for an entire game management unit), mule deer populations across the Arizona Strip are believed to be stable and increasing.

Water sources can have a major influence on the distribution and movements of deer in semi-arid environments (Watkins et al. 2007), particularly in summer (Rosenstock et al. 2004). During summer, does are often distributed closer to water than bucks, presumably because of their increased need for water during lactation (Boroski and Mossman 1996). Water developments appear to increase mule deer populations (Devos and Clarkson 1990). Thus, numerous waters

have been developed to improve mule deer distribution across the landscape and to sustain healthy populations.

Pronghorn (*Antilocapra americana*)

Pronghorn were historically present on the Arizona Strip but were extirpated in the late 1800s. The BLM and the AGFD began reintroduction efforts in 1961 resulting in a current population estimate of approximately 425 individuals across the Arizona Strip. Since reintroduction, pronghorn populations have been cyclic – their numbers have increased and decreased in a direct relationship to precipitation. During periods of drought, poor fawn survival results in low recruitment; conversely, during normal to above normal precipitation years, fawn survival and recruitment increase.

Pronghorn habitat in the project area consists primarily of grassland communities with areas of saltbush, sagebrush, and scattered juniper. Pronghorn habitat on the Arizona Strip is rated by quality from unsuitable to high (Ockenfels et al. 1996). Pronghorn are frequently encountered in the project area in the Mainstreet Allotment. The remaining project locations provide essentially unsuitable habitat for pronghorn due to dense tree cover (primarily pinyon pine and juniper). Habitat categories at each project location are listed in Table 3.4.

Table 3.4. Pronghorn Habitat Category at each Project Location

Project	Habitat Category
Gunsight	Unmodeled
Grama Point 1	Poor Quality
Grama Point 2	Poor Quality
Grama Point 3	Moderate Quality
Grama Point 4	Moderate Quality
Grama Point 5	Poor Quality
Mainstreet Mudhole 2	Moderate Quality
Mainstreet Dutchman	Low Quality
Mainstreet Round Pond	Moderate Quality
Mainstreet Higley	Low Quality
Quail Canyon 1	Unmodeled
Wolfhole Mountain	Unmodeled
Flat Top Well	Moderate Quality
Antelope Spring 1	Poor Quality
Antelope Spring 2	Low Quality
Ruesch Spring Storage Tank	Poor Quality

3.3.2.2 Migratory Birds

The Migratory Bird Treaty Act of 1918 protects against the take of migratory birds, their nests, and eggs, except as permitted. An MOU between the BLM and USFWS states that the BLM shall: "At the project level, evaluate the effects of the BLM's actions on migratory birds during the NEPA process, if any, and identify where take reasonably attributable to agency actions may have a measurable negative effect on migratory bird populations, focusing first on species of concern, priority habitats, and key risk factors. In such situations, BLM will implement approaches lessening such take" (BLM and USFWS 2010).

The USFWS is mandated to identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act. The USFWS *Birds of Conservation Concern 2008* (USFWS 2008) is the most recent effort to carry out this mandate. Bird species considered for the Birds of Conservation Concern (BCC) include nongame birds, gamebirds without hunting seasons, subsistence-hunted nongame birds in Alaska, ESA candidate, proposed, and recently delisted species. Birds of Conservation Concern found on the Arizona Strip within the habitat types of the project areas are summarized in Table 3.5.

Table 3.5. USFWS Birds of Conservation Concern Found in the Project Areas

Species	Habitat Type in the Project Areas
Ferruginous Hawk*	Open grassland or shrubland with isolated trees (typically juniper) for nesting.
Golden Eagle*	Habitat generalist, but usually forages in open country for small mammals and carrion. Large cliff faces are used for nesting.
Peregrine Falcon*	Habitat generalist, but usually associated with canyons (especially near water) where they hunt for other bird species. Cliff faces are used for nesting.
Prairie Falcon	Typically occupy drier and more open country than peregrine falcons, but there is some overlap in habitat. Cliff faces are used for nesting. Found year-round on the Arizona Strip in low numbers.
Burrowing Owl*	Sparsely vegetated grassland or shrubland with existing burrows excavated by badgers, rabbits, or ground squirrels.
Gray Vireo	Found nearly exclusively in pinyon-juniper woodlands during the breeding season. Fairly common on the Arizona Strip.
Pinyon Jay*	Associated with pinyon-juniper woodlands and nearby open country such as sagebrush or saltbush shrublands. Prefers dense stands of pinyon-juniper for nesting.
Juniper Titmouse	Year-round resident of pinyon-juniper woodlands. Common on the Arizona Strip.
Bendire's Thrasher	Favors open habitat with scattered junipers, cliffrose, and sagebrush. An uncommon breeder on the Arizona Strip.
Brewer's Sparrow	Breeds in sagebrush shrublands, but can be found in a variety of open habitats and riparian areas during migration and winter. Typically only nests on the Arizona Strip during years of high precipitation, otherwise

	breeding occurs to the north. Fairly common in large migrating flocks in spring and fall, otherwise uncommon on the Arizona Strip.
Cassin's Finch	Small flocks sporadically occur in higher-elevation pinyon-juniper woodlands during the non-breeding season. Found in higher elevation habitat types such as ponderosa pine during the breeding season. Uncommon on the Arizona Strip.
Black-chinned Sparrow	Breeds in the chaparral habitat type within rocky canyons, especially where cliffrose is present. Fairly common on the west side of the Arizona Strip within its limited habitat type.

* This species is identified as a BLM sensitive species in Arizona, and is addressed in Section 3.2.2.3 of this EA.

3.3.2.3 Sensitive Species

Sensitive species are usually rare within at least a portion of their range. Many are protected under certain state and/or federal laws. Species designated as sensitive by the BLM must be native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management, and either:

1. There is information that a species has recently undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range; or

2. The species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk.

All federally-designated candidate species, proposed species, and delisted species in the 5 years following delisting are included as BLM sensitive species. Based on occurrence records and monitoring data, the sensitive species that may occur within one or more of the project areas and that may be affected by actions proposed in one of the alternatives presented in Chapter 2 are displayed below in Table 3.6.

Table 3.6. Sensitive Species Associated with the Project Areas

Species	Potential for Occurrence
American Peregrine Falcon (*Falco peregrinus*)	Verified
Golden Eagle (*Aquila chrysaetos*)	Verified
Ferruginous Hawk (*Buteo regalis*)	Verified
Western Burrowing Owl (*Athene cunicularia hypugea*)	Verified
Pinyon Jay (*Gymnorhinus cyanocephalus*)	Verified

Additional sensitive species may also occur within the project areas. However, it has been determined by BLM wildlife biologists that these species would not be affected by actions proposed in this EA. These species are therefore not addressed further in this document. Table 3.7 lists the sensitive species that will not be discussed in further detail, along with the rationale for their exclusion from further analysis. Additionally, impacts to sensitive species found outside the project areas were not analyzed.

Table 3.7. Sensitive Species Not Addressed Further in this EA

Species	Rationale for Excluding from Further Analysis
Allen's Big-eared Bat (*Idionycteris phyllotis*) Townsend's Big-eared Bat (*Corynorhinus townsendii*) Greater Western Mastiff Bat (*Eumops perotis californicus*) Spotted Bat (*Euderma maculatum*)	Roost sites such as caves, abandoned mineshafts, and large crevices in cliff faces are inaccessible to work crews and would therefore not be impacted by project activities. Most bat species need more water surface area for drinking than wildlife drinkers typically provide. However, very small bat species, such as western pipistrelle, do utilize drinkers. No measurable impacts (changes from the existing condition) would be expected.
House Rock Valley Chisel-toothed Kangaroo Rat (*Dipodomys microps leucotis*)	This species is endemic to the House Rock Valley on the eastern side of the Arizona Strip and is not present in any of the project areas.
Northern Goshawk (*Accipiter gentilis*)	Habitat for this species is not present in the project areas. On the Arizona Strip goshawks most frequently occupy ponderosa pine forests. Their nest sites are typically located on north-facing slopes with canopy cover of 50% or greater (Reynolds et al. 1992).
Northern Leopard Frog (*Lithobates pipiens*)	This species has a limited range on the Arizona Strip and currently only occupies Soap Creek Tank on the Paria Plateau and possibly Kanab Creek. Habitat for this species is not present in any of the project areas.
Bald Eagle (*Haliaeetus leucocephalus*)	Bald eagles may be found in the project areas during the winter months. Carrion and easily scavenged prey items provide important sources of winter food in terrestrial habitats that are away from open water, such as the proposed catchment locations. The proposed action would have no impact on food sources. No nests are located on the Arizona Strip and nesting habitat (large trees near water) is extremely limited.
Native Fish (5 species)	These species are restricted to the Virgin River, Paria River, and Kanab Creek and do not occur within or near any of the project areas.
Spring Snails (4 species)	These species are restricted to very small ranges and are not known to occur in or near the footprint of any of the proposed catchment sites.

American Peregrine Falcon (*Falco peregrinus anatum*)

Peregrine falcons utilize areas that range in elevation from sea level to 9,000 feet and breed wherever sufficient prey is available near cliffs. Preferred habitat for peregrine falcons consists of steep, sheer cliffs that overlook woodlands, riparian areas, and other habitats that support a high density of prey species. Nest sites are usually associated with water. In Arizona, peregrine falcons now occur in areas that had previously been considered marginal habitat, suggesting that populations in optimal habitats are approaching saturation (AGFD 2002a). Nesting sites, also called eyries, usually consist of a shallow depression scraped into a ledge on the side of a cliff. Peregrine falcons are aerial predators that usually kill their prey in the air. Birds comprise the most common prey item, but bats are also taken (AGFD 2002a).

Potential nesting habitat is found along the steep cliff faces near Quail Canyon and peregrine falcons have nested at three locations within Kanab Creek Canyon within three miles of the proposed Grama Point 1, Grama Point 2, and Gunsight Catchments. Other undocumented nest sites are likely to exist along Kanab Creek and Grama Canyon given the excellent habitat in the area. The presence of water may attract birds, which are prey species for peregrine falcon.

Golden Eagle (*Aquila chrysaetos*)

Golden eagles are typically found in open country, prairies, arctic and alpine tundra, open wooded country and barren areas, especially in hilly or mountainous regions. Black-tailed jackrabbits and rock squirrels are the main prey species taken (Eakle and Grubb 1986). Carrion also provides an important food source, especially during the winter months. Nesting occurs on rock ledges, cliffs, or in large trees. Several alternate nests may be used by one pair and the same nests may be used in consecutive years or the pair may shift to an alternate nest site in different years. In Arizona they occur in mountainous areas and vacate desert areas after breeding. Nests were observed at elevations between 4,000 and 10,000 feet. Nests are commonly found on cliff ledges; however, ponderosa pine, junipers, and rock outcrops are also used as nest sites.

Golden eagles forage over a large area and utilize the project areas for hunting and scavenging. Potential nesting sites are found along the steep cliff faces along Kanab Creek and in Grama Canyon near the proposed Grama Point 1, Grama Point 2, and Gunsight Catchments. Golden eagles have been documented using wildlife drinkers (Rosenstock et al. 2004). The presence of water also attracts small mammals, which are prey species for the golden eagle.

Ferruginous Hawk (*Buteo regalis*)

Ferruginous hawks are large hawks that inhabit the grasslands, deserts, and open areas of western North America – they are the largest North American hawk and are often mistaken for eagles due to their size. Ferruginous means “rusty color” and refers to the bird’s colored wings and legs. During the breeding season, they prefer grasslands, sagebrush, and other arid shrub country. Nesting occurs in trees or utility poles surrounded by open areas. Mammals generally comprise 80 to 90 percent of the prey items or biomass in the diet with birds being the next most common mass component.

Ferruginous hawks are known to use open areas within the project areas, especially during the winter when they are fairly common. Although nesting habitat is available, especially in the Antelope Spring, Mainstreet, and Grama Point Allotments, no nest sites are known to occur within three miles of any of the proposed catchments.

Western Burrowing Owl (*Athene cunicularia hypugea*)

Burrowing owls occupy a wide variety of open habitats including grasslands, deserts, or open shrublands. Burrowing owls do not dig their own burrows and must rely on existing burrows dug by prairie dogs, ground squirrels, badgers, skunks, coyotes, and foxes but will also use manmade and other natural openings. Nest-site fidelity is high and burrows are often reused for several years if not destroyed (Haug et al. 1993). Moderate grazing can have a beneficial impact on burrowing owl habitat by keeping grasses and forbs low (MacCracken et al. 1985) Burrowing owls can be generally tolerant of some human presence, often nesting in close proximity to urban or suburban areas in agricultural fields, vacant lots, golf courses, or areas cleared for construction (AGFD 2009). Burrowing owls are infrequently encountered on the Arizona Strip likely due to the lack of prairie dog or other large rodent colonies.

Burrowing owl habitat is present within the proposed Antelope Spring, Mainstreet, and Grama Point project areas. Nesting areas have been documented in the Mainstreet Allotment. Burrowing owls have been recorded using wildlife drinkers in southwest Arizona (Rosenstock et al. 2004).

Pinyon Jay (*Gymnorhinus cyanocephalus*)

The pinyon jay is a medium-sized corvid that inhabits much of the intermountain west and is particularly associated with pinyon-juniper ecosystems. Pinyon jays are highly social birds that nest communally and form large flocks that may number into the hundreds. Pinyon jays harvest seeds of pinyon pine, and to a lesser extent ponderosa and limber pine, during the fall and cache these seeds for use in late winter and early spring when other food sources are scarce (Balda and Bateman 1971). Caches are often located in areas that receive little snow, such as under pine and juniper tree crowns or on south slopes where snow melts early, allowing the caches to be accessible during late winter and early spring (Wiggins 2005). Spatial memory is highly developed in pinyon jays and cache relocation is efficient and reliable (Stotz and Balda 1995). Seeds that are not relocated and consumed will often germinate and contribute to pinyon pine regeneration.

Pinyon jay habitat preferences include mosaics of large tracts of pinyon-juniper woodlands especially those areas that contain large, mature, seed-producing pinyon pines, and relatively open structure with mixed shrubs (especially sagebrush) and grasses (Gabaldon 1979, Latta et al. 1999). One nesting colony of pinyon jays typically requires an area of about 230 acres for nesting and about 5,120 acres for total home range (Balda and Bateman 1971).

Pinyon-juniper woodlands that may provide sufficient habitat to support nesting colonies of pinyon jays are present in the project areas in the Wolfhole Mountain, Quail Canyon, and southern Grama Point Allotments. Pinyon jays have been seen drinking from several wildlife drinkers and livestock troughs and reservoirs on the Arizona Strip.

3.3.3 Livestock Grazing

As stated previously the proposed project areas are within the Arizona Strip Field Office and consist of the Gunsight, Grama Point, Mainstreet, Quail Canyon, Wolfhole Mountain., Flat Top Well, and Antelope Spring, grazing allotments. Table 3.8 lists the season of use and allowable stocking rate for each of these allotments.

Table 3.8 Allotment Seasons of Use and Stocking Rates

Allotment Name	Allot. #	Season of Use	Active AUMs	Permitted Use Livestock #s	Grazing System
Gunsight	5320	Seasonal (Winter/Spring) 10/15- 4/30	425	65 cows	Two pasture deferred
Grama Point	5233	Seasonal (Winter/Spring) 10/15- 5/31	2,057	276 cows	Two pasture deferred
Mainstreet	4808	Year Long	14,535	1,558 cows, 15 horses	"Best Pasture" System
Quail Canyon	4856	Year Long	808	68 cows	Three pasture deferred
Wolfhole Mtn.	4839	Seasonal (Summer)	318	105 cows	Seasonal
Flat Top Well	5214	Yearlong	874	82 cows	Two pasture deferred
Antelope Spring	5210	Yearlong	1,157	120 cows	Three pasture deferred

Gunsight Allotment

This allotment contains two pastures; it is used seasonally in the winter/early spring, in a rotation grazing system in conjunction with State Land that is leased in Utah. The allotment is rested during the growing season every year (from April 30 to October 15). This system allows both cool and warm season plants to grow (to replenish root reserves and increase plant vigor) and set seed every season.

As described in Section 1.2 of this EA, this allotment has only one reliable water source that comes from a catchment located in the Gunsight Pasture of the allotment. However, water distribution in the Line Shack pasture is limited because water is provided by earthen reservoirs which do not provide a dependable water source and leaves half of the allotment without reliable water for most of the year.

Grama Point Allotment

The grazing system on this allotment is a two pasture deferred rotation system. The allotment is used as part of a two-allotment system – Grama Point Allotment is grazed from October 15 to May 31, and then cattle are transferred to summer range in Utah from June 1 to October 14. By using this system, each pasture is rested through the growing season every other year.

As described in Section 1.2 of this EA, this allotment has two reliable water sources that come from catchments. Both of these catchments are located in the southern portion of the allotment, one in the Kanab Rim Pasture, and the other in the Findley Tank Pasture. However, overall water distribution in both pastures is limited because all other sources for water are provided by earthen reservoirs and thus do not provide a dependable water source. A well also provided water to both pastures but collapsed and no longer functions which leaves much of the allotment without reliable water for most of the year. This results in uneven distribution of livestock and therefore uneven utilization of forage in the southern portion of both the Kanab Rim and Findley Tank Pastures.

Mainstreet Allotment

The allotment is split into two main segments, a summer use area on the south and west portions of the allotment and a winter use area on the east side. Four pastures that are located between the two segments serve as transition pastures from summer to winter ranges and vice versa. These four pastures are also used for separation and shipping purposes. The allotment is using a grazing system called the "best pasture" system. Each year the area being moved into is looked over by the BLM and the permittee to determine which pastures to use and in what sequence. This allows for flexibility while taking into consideration which pastures need deferment or rest based on past use (timing, intensity and duration) and vegetative response to seasonal precipitation patterns (timing, duration, amount and widespread vs. isolated storms).

The main sources of water on the Mainstreet Allotment, including the pastures where projects are proposed, are provided by large earthen ponds or reservoirs built along dry washes or drainages throughout the allotment. Although many of these ponds are strategically located throughout pastures for good distribution of livestock, it does not guarantee reliable water on an annual basis due to the unreliability of scattered summer rainfall events and capabilities of reservoir storage. This makes it difficult for the permittee and the BLM to best plan and adhere to this grazing system.

Quail Canyon Allotment

This allotment uses a three pasture rotational grazing system. The area being grazed each year has recently had several months of rest from grazing. This grazing system allows rest periods for the key species by rotating use of the pastures each year and one pasture is rested through the growing season each year. The system also provides for cattle to be moved among pastures to avoid more than 50% utilization of any pasture. This allows pastures to be used after full plant growth recovery and seed dissemination has occurred. The main source for water in the Top North and Top South Pastures are earthen reservoirs which are an unreliable water source year-

round as they depend on rainfall events in order to fill, and lack in water storage capabilities. Lack of reliable water in the Top North and Top South Pastures make it difficult for the permittee and the BLM to best plan and adhere to this grazing system outlined in the AMP. These proposed additional water sources would be available to wildlife year-round as well as aid in keeping livestock dispersed throughout the allotment at all times of the grazing season, which would result in more uniform utilization of key forage species

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Wolfhole Mountain Allotment

This allotment contains a single pasture; it is used seasonally in the summer. This allows the allotment to be rested during the growing season every year (only used in the month of June). This system allows both cool and warm season plants to grow (to replenish root reserves and increase plant vigor) and set seed every season. The only sources of water on the Wolfhole Mountain Allotment are provided by large earthen ponds or reservoirs built along dry washes or drainages throughout the allotment. Although these ponds are strategically located throughout the allotment for good distribution of livestock, it does not guarantee reliable water on an annual basis due to the unreliability of scattered summer rainfall events and capabilities of reservoir storage. This makes it difficult for the permittee and the BLM to best plan and adhere to this grazing system. This proposed additional water source would be available to wildlife year-round as well as aid in keeping livestock dispersed throughout the allotment at all times of the grazing season, which would result in more uniform utilization of key forage species

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Flat Top Well Allotment

This allotment uses a two pasture seasonal rotational grazing system. This system allows both cool and warm season plants to grow (to replenish root reserves and increase plant vigor) and set seed every other season. This grazing system allows rest periods for plants by rotating use of the pastures each year; each pasture has several months of rest from grazing, and is rested during the growing season every other year. The proposed pipeline extension and trough would provide a reliable source of water to the southern portion of the West Pasture. Currently the main sources of water in this portion of the pasture are provided by large earthen ponds or reservoirs. These reservoirs are continually being breached due to flash floods and have proven to be an unreliable source for providing water to both livestock and wildlife, this makes it difficult for the permittee and the BLM to best plan and adhere to the grazing system for this allotment.

Antelope Spring Allotment

This allotment uses a three pasture rotational grazing system. The pasture being grazed has recently had several months of rest from grazing. This grazing system allows rest periods for the key species by rotating use of the pastures each year and one pasture is rested through the growing season each year. The system also provides for cattle to be moved among pastures to avoid more than 50% utilization of any pasture. This allows pastures to be used after full plant

growth recovery and seed dissemination has occurred. This allotment has a reliable spring but is lacking a way to store the water produced. The proposed storage tank would be near the existing spring and tire trough. Currently, the spring produces ½ gallon per minute, which is very little water on a short term basis when cattle are grazing this pasture. This is too little water to provide a reliable water source and keep cattle evenly distributed. However, on a long term basis, ½ gallon per minute equates to 262,800 gallons a year. This project would install a storage tank of up to 100,000 gallons near the spring.

Two catchments with troughs have also been proposed in the Antelope Spring Pasture. Currently the main sources of water in this portion of the pasture are provided by large earthen ponds or reservoirs. These reservoirs are continually being breached due to flash floods and have proven to be an unreliable source for providing water to both livestock and wildlife, this makes it difficult for the permittee and the BLM to best plan and adhere to the grazing system for this allotment. These additional water sources would aid in keeping livestock dispersed throughout the allotment at all times of the grazing season, which would result in more uniform utilization of key forage species.

Chapter 4

ENVIRONMENTAL CONSEQUENCES

The potential consequences or effects of each alternative are discussed in this chapter. Only impacts that may result from implementing the alternatives are described in this EA. If an ecological component is not discussed, it is because BLM resource specialists have considered effects to the component and found the proposed action would have minimal or no effects (see Table 3.1). The intent of this analysis is to provide the scientific and analytical basis for the environmental consequences.

Impacts are defined as modifications to the existing condition of the environment and/or probable future condition that would be brought about by implementation of one of the alternatives. Impacts can be direct or indirect; direct impacts are those effects that are caused by the action or alternative and occur at the same time and place, while indirect effects are those effects that are caused by or would result from an alternative and are later in time but that are still reasonably certain to occur. Cumulative effects are generally assessed using the environmental impacts of past, present, or reasonably foreseeable future actions within the project areas.

4.1 VEGETATION

4.1.1 Impacts of Alternative A – Proposed Action

Table 4.1 shows the total number of acres of disturbance per allotment under this alternative.

Table 4.1. Acres of Disturbance Per Project

Allotment Name	Proposed Project	Acres Disturbed	Percent of Allotment
Gunsight	1 catchment/trough	2 acres	0.027%
Grama Point	5 catchments/troughs	10 acres	0.042%
Mainstreet	4 catchments / 2 pipeline extensions /troughs	15.5 acres	0.010%
Quail Canyon	1 catchment/ 1 pipeline extension/troughs	5.6 acres	0.035%
Wolfhole Mtn.	1 catchment/troughs	2 acres	0.014%
Flat Top Well	1 pipeline extension/trough	3.6 acres	0.041%
Antelope Spring	2 catchments /1 storage tank/troughs	5 acres	0.035%
TOTAL ACRES DISTURBED		**43.7 acres**	

A crawler tractor with ripper tooth attached and lowered into the ground would be driven across the route of each pipeline in order to loosen the soil and allow for the pipe to be more easily installed as the tractor makes a second pass over the route to install the pipeline. Under the best management practices described in Section 2.1.1 of this EA, construction activities would be limited to periods when the soil and ground surface are not wet in order to avoid soil compaction. This would minimize the potential for any soil compaction to occur. In addition, actual disturbance would only occur in the path of the dozer tracks and a 12 to 16-inch point of impact from the ripper tooth. Due to the small impact area and the presence of existing perennial vegetation (forbs, grasses and shrubs), the need for rehabilitation (i.e., reseeding) was not deemed necessary. Crushed vegetation would respond and recover quickly, as would re-establishment of perennial vegetation in the disturbed areas, a result of existing seed sources nearby. All of these factors would thus facilitate perennial vegetative recovery and response in disturbed areas.

Troughs placed along the pipelines and at the catchments and storage tank would be constructed using heavy equipment sized tires and secured to the proposed location using concrete. Vegetation in the small 10 foot diameter of trough placement would be lost.

Plants live in ecosystems full of herbivores that range from small insects to large grazing animals. Losing leaves or stems to herbivores is a common event in the life of a rangeland plant. For range-land plants to remain healthy and productive, enough vegetation must remain after grazing so that plants can photosynthesize and manufacture energy to produce more leaves, stems, and seeds. Plants also need to produce and store energy such as starches and sugars in roots and crowns to successfully start the next season of growth. Only when too much of the plant is removed does the plant suffer in a way that yields lasting detrimental effects. Substantial damage to rangeland plants generally only occurs under repeated and heavy grazing (University of Idaho 2011).

Livestock can directly affect vegetation by reducing plant vigor, decreasing or eliminating desirable forage species, increasing soil instability and erosion, reducing water quantity and quality, and causing loss of, or injury to, individual plants from trampling, particularly near water developments. Long-term changes in vegetation may result if livestock use consistently exceeds established allocations. Improper grazing practices (such as excessive utilization which removes vegetative cover) may lead to soil compaction, reduced infiltration rates, increased runoff and erosion, and declines in watershed condition. Grazing impacts on vegetation are mitigated by timing of use, adjustment of stocking rates, limiting utilization rates, and conformance with the Arizona Standards for Rangeland Health and Guidelines for Livestock Grazing Management.

Range plants evolved to withstand grazing and can withstand a heavy grazing event if done in the right season and if plants are given enough time to recover after grazing. Thus, plants can withstand removal of a part of their current year's growth and still achieve normal growth the following year. Most rangeland grasses and forbs can have 40-50% of their leaves and stems removed every year and still remain healthy and productive. In general, light use is considered less than 40%, moderate 40-65%, and heavy greater than 65% of biomass removed.

The current grazing systems on these allotments utilize various types of rotational systems, which allow for periodic rest of each pasture to increase plant vigor and thus minimize adverse effects to

vegetation. However, the "success" of the grazing systems relies on the presence of reliable water sources – water must be present in and across each pasture in order for the rotation system to be fully implemented. The proposed action would result in more reliable water sources in each of the subject allotments, and therefore benefit vegetation throughout each allotment as described above.

High use would occur on vegetation near troughs; however, the scope of these impacts would be limited because the troughs would be located either next to existing reservoirs or along existing roads, and all of the proposed pipeline locations would also be along existing roads, where disturbance to vegetation has already occurred. The high use near waters would be offset by better distribution of livestock grazing in the allotments from the proposed projects. Overall utilization would be more uniform throughout the pastures and would not exceed the maximum allowable of 50%. This more uniform distribution and utilization would allow the vegetation in the pastures to maintain at or better progress toward its natural potential by increasing plant diversity and vigor. Thus, ecological status of these allotments would be maintained and/or improved.

Under this alternative, a fence would be constructed around each catchment apron. The fence would have 16½ -foot spacing between steel posts with 2 stays between posts. Braces would be installed in each corner of the fence. A posthole digger mounted on a rubber-tired tractor would be used to dig holes for the brace posts. Access into the fence line route would be by road and any overland travel would be limited to a 15 foot wide path along the fence line, and construction activities would be limited to periods when the soil and ground surface are not wet in order to avoid soil compaction. Short-term vegetative impacts would result from the crushing of vegetation from the truck tires and rubber-tired tractor. However, due to the small impact area and the presence of existing perennial vegetation (forbs, grasses and shrubs), the need for rehabilitation (i.e., reseeding) was not deemed necessary. Once completed, crushed vegetation (i.e. perennial forbs and grasses) would recover quickly. Long-term disturbance would be minimal, with only the spot where a steel or wooden post enters the ground. All of these factors would thus facilitate perennial vegetative recovery and response in disturbed areas as a result of fence construction and maintenance.

4.1.2 Impacts of Alternative B – No Action

Under this alternative, no pipelines, catchments, storage tanks, or troughs would be installed, so the acreages listed in Table 4.1 would receive no additional impacts. No vegetation would be crushed or trampled by rubber tires from trucks or cleats from tractors, and no vegetation would be uprooted by the ripper tooth from pipeline installation or in clearing a spot for the catchment aprons, storage facilities, or troughs. However, the overall condition of vegetation in these allotments may not improve, or may not improve as quickly, since the same livestock distribution and patterns would persist that currently exist. These impacts would not be offset by better distribution by livestock, and the associated more uniform utilization in each allotment from the water developments proposed in Alternative A. This would not allow the vegetation in each subject pasture to better progress toward its natural potential. Thus, ecological status for these pastures would remain the same, or would progress more slowly.

4.2 WILDLIFE, INCLUDING BIG GAME SPECIES, MIGRATORY BIRDS, AND SENSITIVE SPECIES

4.2.1 Impacts of Alternative A – Proposed Action

4.2.1.1 Big Game Species

Mule Deer (*Odocoileus hemionus*)

As described in Section 4.1 above, construction activities would result in some short-term disturbance to habitat. As shown in Table 4.1, after construction is completed, the area of long-term disturbance would be minimal (43.7 acres total, or less than 0.05% of the total acres in the subject allotments). In addition, there would not be any conflicts with livestock for forage as sufficient forage for mule deer would be provided by ensuring that utilization limits (of no more than 50% of current year's growth) are not exceeded (see discussion on impacts to vegetation in Section 4.1.1).

The proposed new water sources would meet the objectives stated in the *Arizona Strip Interdisciplinary Mule deer Management Plan 2015-2019* (AGFD and BLM 2015) pertaining to water availability and distribution – yearlong water availability and distribution would be increased in Units 12B, 13A, and 13B. While there would be more impact to vegetation (i.e., habitat) close to water, the scope of these impacts would be limited because the majority of new troughs would either be located near existing reservoirs or along existing roads, and the majority of the proposed pipeline locations would also be along existing roads, where disturbance to vegetation has already occurred. (See Section 4.1.1 for more detailed discussion on impacts to vegetation from the Proposed Action.) The grazing management system identified in each AMP would continue to be followed, and with more reliable waters within each affected pasture, more uniform distribution and utilization would occur across the pasture, thus reducing long-term effects close to each water.

Mule deer would likely avoid the construction areas and be temporarily displaced during work periods. Construction activities and human presence would result in a localized and temporary increase in noise that would likely cause mule deer to temporarily avoid the vicinity. Although deer would temporarily be displaced, once the pipelines and water catchments are completed and troughs are installed, the availability of water would be improved which would improve distribution and use in the area. The long-term benefits of more consistent water sources for mule deer would outweigh any short-term adverse impacts that could result from construction. Long-term impacts from the proposed action would therefore be increased distribution of water.

Pronghorn (*Antilocapra americana*)

Pronghorn would likely avoid the construction areas and be temporarily displaced during work periods. Construction activities and human presence would result in a localized and temporary increase in noise that would likely cause pronghorn to temporarily avoid the vicinity. Although

pronghorn would be temporarily displaced once the catchments and pipelines are completed and troughs are installed, the availability of water would be improved.

The proposed new water sources would meet the objectives stated in the *Arizona Statewide Pronghorn Management Plan* (AGFD 2009) pertaining to water availability – yearlong water availability and distribution would be increased in pronghorn habitat. While there would be more impact to vegetation (i.e., habitat) close to water, the scope of these impacts would be limited because the majority of new troughs would either be located near existing reservoirs or along existing roads, and the majority of the proposed pipeline locations would also be along existing roads, where disturbance to vegetation has already occurred. (See Section 4.1.1 for more detailed discussion on impacts to vegetation from the Proposed Action.) The grazing management system identified in each AMP would continue to be followed, and with more reliable waters within each affected pasture, more uniform distribution and utilization would occur across the pasture, thus reducing long-term effects close to each water.

Pronghorn benefit from reliable water sources spaced less than three miles apart. Water use is highest in conditions exhibiting high temperatures, dry forage, dry atmospheric conditions, and lack of snow in winter months. During dry periods, pronghorn tend to remain close to available water. During summer, does are often distributed closer to water than bucks, presumably because of their increased need for water during lactation. Most observations of pronghorn in Arizona and New Mexico are usually within two miles of water (Ockenfels et al. 1994; Clemente et al. 1995; Authenrieth et al. 2006).

The long-term benefits of more consistent water sources for antelope would outweigh any short-term adverse impacts that could result from construction. Long-term impacts from the proposed action would therefore be increased distribution of water.

4.2.1.2 Migratory Birds

Water development project construction would result in a temporary loss of habitat for foraging, migration, and breeding, as well as disturbance from construction noise and presence of humans within each project area. Construction activities would result in some short-term disturbance (see acres of disturbance per allotment listed in Table 4.1) and short-term loss of habitat, while long-term disturbance would be minimal. Approximately 30 acres of habitat would be permanently lost due to construction of the water catchments but this is a negligible loss of migratory bird habitat compared with the relative amount of habitat available in the surrounding landscape. The proposed improvements have been designed to minimize impacts to vegetation by restricting construction activities to a 15-foot wide footprint along the 8.15 total miles of pipelines, as well as limiting construction activities to periods when soils are dry (in order to minimize soil compaction and associated potential impacts to plant vigor). All of the proposed pipeline routes are along roads which are areas previously impacted. Impacts would be mostly to shrubs, forbs, and grasses. The amount of disturbance to vegetation would be negligible and would not hinder migratory birds' ability to forage.

Migratory birds would likely avoid the construction areas and be temporarily displaced during work periods. Construction activities and human presence would result in a localized and temporary increase in noise that would likely cause migratory birds to temporarily avoid the vicinity. If construction occurs in early spring, short-term impacts to migratory birds could impact individual birds that arrive early to breeding sites and could lead to abandonment of early breeding and/or nesting attempts. Equipment associated with construction may also generally affect migratory birds as a result of noise. The increased noise and construction activity would occur only in the short term. In the long term, occasional maintenance would have a negligible impact to migratory birds since these activities would only be occasional and intermittent.

Impacts to migratory birds would be minimized by implementing the best management practices listed in Section 2.1.1. (i.e., measures would be taken to protect active bird nests and activities would be limited to daylight hours, open pipes would be capped). Additionally, by minimizing disturbance to vegetation, migratory birds would have access to the vegetation for cover and as an area to forage once construction is complete.

Upon completion of each proposed water development, migratory birds would benefit in the long-term by having reliable water sources for drinking and bathing. Wildlife escape ramps would be secured in each trough before it is filled. Either lids or wildlife escape ramps and floating bird ladders would be installed to the storage tanks or ponds.

4.2.1.3 Sensitive Species

Peregrine Falcon

Peregrine falcons may fly over or forage in the vicinity of the project areas, but the amount of habitat that would be impacted by construction activities is minimal (compared with the overall range of the species). Impacts may occur to peregrine falcons if construction activity impacts the nesting habitat of the species or causes a reduction in prey abundance through vegetation removal. However, no nesting sites occur within the effects zone of the project areas. Although the proposed action could have minor short-term impacts to individual falcons (due to construction activities), no impacts to the species (i.e., a loss of viability) are expected. There would not be any conflicts for forage between prey species of the peregrine falcon and livestock as sufficient forage would be provided by ensuring that utilization limits (of no more than 50% of current year's growth) are not exceeded. Overall utilization would also be more uniform throughout the pastures. This more uniform distribution and utilization should help maintain at or better progress toward meeting the desired plant community objectives identified in the land health evaluations (see discussion on impacts to vegetation in Section 4.1.1), which would be beneficial to habitat for prey species.

Golden Eagle

Golden eagles forage throughout the Arizona Strip, and may fly over or forage in the vicinity of the project areas. However, the amount of habitat that would be impacted by construction activities is minimal (compared with the overall range of the species). Impacts may occur to golden eagles if construction activity impacts the nesting habitat of the species or causes a reduction in prey

abundance through vegetation removal. However, no nesting sites occur within the project areas, or would be affected by the projects. Although the proposed action could have minor short-term impacts to individual eagles (due to construction activities), no impacts to the species (i.e., a loss of viability) are expected. There would not be any conflicts for forage between prey species of the golden eagle and livestock as sufficient forage would be provided by ensuring that utilization limits (of no more than 50% of current year's growth) are not exceeded. Overall utilization would also be more uniform throughout the pastures. This more uniform distribution and utilization should help maintain at or better progress toward meeting the desired plant community objectives identified in the land health evaluations (see Section 4.1.1 of this EA), which would be beneficial to habitat for prey species.

Access to reliable water sources, especially during drought conditions, would benefit many small mammals and birds that golden eagles prey upon. Black-tailed jackrabbits, an important prey species for golden eagles, have been documented to use water catchments (Rosenstock et al. 2004, O'Brien et al. 2006). The presence of properly functioning water sources may benefit golden eagles by providing reliable water sources to prey species.

Ferruginous hawk

As described in Section 3.2.2.4, ferruginous hawks may occasionally use the area of the proposed projects for foraging. However, the amount of habitat that would be impacted by construction activities is minimal (compared with the overall range of the species). Impacts may occur to ferruginous hawks if construction activity causes a reduction in prey abundance through vegetation removal. Although the proposed action could have minor short-term impacts to individual hawks (due to construction activities), no impacts to the species (i.e., a loss of viability) are expected. There would not be any conflicts for forage between prey species of the ferruginous hawk and livestock as sufficient forage would be provided by ensuring that utilization limits (of no more than 50% of current year's growth) are not exceeded. Overall utilization would also be more uniform throughout the pastures. This more uniform distribution and utilization should help maintain at or better progress toward meeting the desired plant community objectives identified in the land health evaluations (see Section 4.1.1 of this EA), which would be beneficial to habitat for prey species.

Western Burrowing Owl

Western burrowing owl habitat within the project areas consists of desert scrub vegetation. Because western burrowing owls forage during the day, when construction activities would occur, the foraging behavior of the owls could be impacted in the short term by the vibration of construction equipment or be destructive to burrows during construction activity. However, the area disturbed would be minimal, compared with the overall range of the owl – impacts to habitat would be limited because the majority of new troughs would either be located at existing reservoirs or along existing roads, and the majority of the proposed pipeline locations would also be along existing roads, where ground disturbance and disturbance to vegetation has already occurred. In addition, impacts to nesting birds would be minimized by implementing the best management practices listed in Section 2.1.1 (i.e., measures would be taken to protect nesting birds). Although the proposed action could have minor short-term impacts to individual western burrowing owls, no long-term impacts to the species (i.e., a

trend toward Federal listing or loss of viability) are expected. There would not be any conflicts for forage between prey species of the western burrowing owl and livestock as sufficient forage would be provided by ensuring that utilization limits (of no more than 50% of current year's growth) are not exceeded. Overall utilization would also be more uniform throughout the pastures. This more uniform distribution and utilization should help maintain at or better progress toward meeting the desired plant community objectives identified in the land health evaluations (see discussion on impacts to vegetation in Section 4.1.1), which would be beneficial to habitat for prey species.

Pinyon Jay

The proposed catchment on the Wolfhole Mountain Allotment would involve construction of a catchment through open-structure pinyon-juniper habitat. However, alteration of the forest structure (and therefore habitat for this species) would not occur – other than potential removal of a few individual trees – given that the proposed catchment avoids trees whenever possible. Wildlife escape ramps would be secured in each trough before it is filled. Either lids or wildlife escape ramps and floating bird ladders would be installed to the storage tanks or ponds.

No habitat alteration in pinyon-juniper overstory is proposed at this catchment and pinyon pine seed crops would not be impacted. Pinyon jays may avoid the catchment site during short-term construction disturbance lasting up to two weeks, but would have ample undisturbed foraging habitat available. Lynn et al. (2006) observed that resident birds in southwest Arizona frequently utilize catchments for drinking and bathing and Johnson et al. (2011) captured pinyon jays for a telemetry study at a frequently used wildlife drinker. Pinyon jays have been documented using wildlife drinkers on the Arizona Strip including the Hack's #1 and Pronghorn Catchments (Langston, personal obs.). Reliable water sources located within or near pinyon jay territories during the summer months would benefit pinyon jays.

4.2.2 Impacts of Alternative B – No Action

4.2.2.1 Big Game Species

Mule Deer (*Odocoileus hemionus*)

Under this alternative, no construction activities would occur. Therefore, there would be no disturbances including noise or human presence to disrupt deer, and no disturbance to vegetation resulting from installation of catchments, pipelines, water troughs, and storage tanks.

As stated in Section 1.2 of this EA, the *Arizona Strip Interdisciplinary Mule deer Management Plan 2015-2019* states that "water distribution should be improved in [Units 12B, 13A, and 13B] by utilizing both cooperative projects and wildlife catchments" (AGFD and BLM 2015). Under this alternative, no additional water sources for wildlife (including mule deer) would be constructed. Thus, mule deer would not benefit by improved water distribution within the subject allotments/pastures from the proposed water projects.

Pronghorn (Antilocapra americana)

Under the no action alternative, no construction activities would occur. Therefore, there would be no disturbances including noise or human presence to disrupt pronghorn, and no disturbance to vegetation resulting from installation of catchments, pipelines, water troughs, or storage tanks. As stated in Section 1.2 of this EA, the *Arizona Statewide Pronghorn Management Plan* (AGFD 2009) identifies a number of management objectives, including objectives related to fences and water availability. Under this alternative, no additional water sources for wildlife (including pronghorn) would be constructed. Thus, pronghorn would not benefit by improved water distribution within the subject allotments/pastures from the proposed water projects.

4.2.2.2 Migratory Birds

Under this alternative, no construction activities and, therefore, no additional ground disturbance would occur. As a result, there would be no additional loss of habitat. Opportunities for migratory birds to forage migrate, or breed would not be adversely impacted because no construction activities, including noise or human presence, and associated ground disturbance would occur. However, no additional water sources for wildlife (including migratory birds) would be constructed. Thus, these species would not benefit by improved water distribution from the proposed water projects.

4.2.2.3 Sensitive Species

Peregrine Falcon

Since no catchments, pipelines or storage tank construction would occur, there would be no disturbance to foraging falcons or to their prey from implementation of this alternative. In addition, no vegetation crushing would occur, so no impacts to prey habitat would occur beyond current conditions. However, no additional (reliable) water sources would be provided (to enhance the foraging habitat for peregrine falcon prey species). Lack of available water (when livestock ponds go dry during periods of drought) could limit availability of prey in localized areas. No adverse impacts to the species (i.e., a trend toward Federal listing or loss of viability) would occur from this alternative, but the potential benefits from additional water sources would also not occur.

Golden Eagle

Since no catchments, pipelines or storage tank construction would occur, there would be no disturbance to foraging eagles or to their prey from implementation of this alternative. In addition, no vegetation crushing would occur, so no impacts to prey habitat would occur beyond current conditions. However, no additional (reliable) water sources would be provided (to enhance the foraging habitat for golden eagle prey species). Lack of available water (when livestock ponds go dry during periods of drought) could limit availability of prey in localized areas. No adverse impacts to the species (i.e., a trend toward Federal listing or loss of viability) would occur from this alternative, but the potential benefits from additional water sources would also not occur.

Ferruginous Hawk

Since no catchments, pipelines or storage tank construction would occur, there would be no disturbance to foraging hawks or to their prey from implementation of this alternative. In addition, no vegetation crushing would occur, so no impacts to prey habitat would occur beyond current conditions. However, no additional (reliable) water sources would be provided (to enhance the foraging habitat for ferruginous hawk prey species). Lack of available water (when livestock ponds go dry during periods of drought) could limit availability of prey in localized areas. No adverse impacts to the species (i.e., a trend toward Federal listing or loss of viability) would occur from this alternative, but the potential benefits from additional water sources would also not occur.

Western Burrowing Owl

The no action alternative would have no direct impacts to individual western burrowing owls or to the species (i.e., a trend toward Federal listing or loss of viability) since no construction activities would occur within burrowing owl habitat.

Pinyon Jay

Pinyon-juniper woodlands are extensive in the Wolfhole Mountain Allotment; these woodlands would remain sufficient to support nesting colonies of pinyon jays under the no action alternative. This alternative would not provide additional water that could benefit pinyon jays.

4.3 LIVESTOCK GRAZING

4.3.1 Impacts of Alternative A – Proposed Action

Implementation of the proposed action would result in more uniform distribution of cattle within the subject allotments (Gunsight, Grama Point, Mainstreet, Quail Canyon, Wolfhole Mountain, Flat Top Well, and Antelope Spring,). The catchments, pipelines with water troughs, and the storage tanks would provide reliable sources of water being available at appropriate times for the grazing of livestock, which would help to distribute livestock more evenly throughout the subject pastures by having the waters scattered throughout and being able to use different portions of the pastures at different times, thus providing the permittees more reliability for pasture use in the established grazing systems.

Gunsight Allotment

This allotment contains two pastures; it is used seasonally in the winter/early spring, in a rotation grazing system in conjunction with State Land that is leased in Utah. The allotment is rested during the growing season every year (from April 30 to October 15). This system allows both cool and warm season plants to grow (to replenish root reserves and increase plant vigor) and set seed every season.

As described in Section 1.2 of this EA, this allotment has only one reliable water source that comes from a catchment located in the Gunsight Pasture of the allotment. However, water distribution in the Line Shack pasture is limited because water is provided by earthen reservoirs and thus do not provide a dependable water source which leaves half of the allotment without reliable water for most of the year.

Grama Point Allotment

This allotment is a two pasture deferred rotation system. The allotment is used as part of a two-allotment system – Grama Point Allotment is grazed from October 15t to May 31, and then cattle are transferred to summer range in Utah from June 1 to October 14t. By using this system, each pasture is rested through the growing season every other year.

As described in Section 1.2 of this EA, this allotment has two reliable water sources that come from catchments. Both of these catchments are located in the southern portion of the allotment, one in the Kanab Rim Pasture, and the other in the Findley Tank Pasture. However, water distribution in both of these pastures is limited because all other sources for water are provided by earthen reservoirs and thus do not provide a dependable water source. A well also provided water to both pastures but collapsed and no longer functions, which leaves much of the allotment without reliable water for most of the year. This results in uneven distribution of livestock and therefore uneven utilization of forage in the southern portion of both the Kanab Rim and Findley Tank Pastures.

Mainstreet Allotment

As described in Section 3.2.3 of this EA, the main sources of water on the Mainstreet Allotment are provided by large earthen ponds or reservoirs built along dry washes or drainages throughout the allotment. Although many of these ponds are strategically located throughout pastures for good distribution of livestock, it does not guarantee reliable water on an annual basis due to the unreliability of scattered summer rainfall events and capabilities of reservoir storage. It then makes it difficult for the permittee and the BLM to best plan and adhere to the grazing system established for this allotment. The four catchments and two pipeline extension projects have been proposed in order to provide reliable year-round water across the allotment in an effort to achieve more uniform livestock distribution, and therefore more uniform utilization of key forage species. This would give the permittee more reliability and flexibility for pasture use in this grazing system while also allowing more reliable rest for the various pastures (see Section 4.1.1).

Quail Canyon Allotment

The Quail Canyon Allotment is divided into three pastures which are used to rotate livestock use in order to maintain or increase the vigor of existing forage species within the allotment by providing periods of no livestock grazing during the growing season. This allotment has one reliable water source shared between the Top North and Top South Pastures. Water distribution in these two pastures is limited as all other water sources are provided by earthen reservoirs whose dams are

continually being breached, and thus do not provide a dependable water sources for the allotment. This results in uneven distribution of livestock, and therefore uneven utilization of forage in the central portion of the Top North and Top South pastures. Therefore, adding an additional reliable water source in these areas (i.e., the proposed catchment, pipeline extension and troughs) would result in more uniform distribution of livestock and therefore more uniform utilization of forage (while not exceeding the maximum utilization level of 50%), as well as allow the permittee more reliability in adhering to the grazing system established in the allotment management plan which is the stated purpose and need for the projects. Having reliable water helps ensure that pasture rotations occur as planned, provide more reliable deferment and rest for pastures and vegetation, which should help maintain the desired plant composition objectives that were identified in the land health evaluation and therefore rangeland health within the pasture (see Section 4.1.1).

Wolfhole Mountain Allotment

As described in Section 3.2.3 of this EA, this allotment consists of a single pasture; it is used seasonally in the summer in a rotation grazing system in conjunction with other BLM grazing allotments. Currently there are no reliable water sources on the allotment. There are several earthen reservoirs on the allotment, but they are unreliable as they depend on rainfall events in order to fill, lack in water storage capabilities, and leak due to the soils' inability to retain water. Although these other ponds on the allotment are strategically located for good distribution of livestock, they do not guarantee reliable water on an annual basis. This lack of water affects the distribution of livestock, and makes uniform grazing on the allotment difficult.

The proposed catchment would create a new water source in the northern part of the allotment which currently has no water. The addition of this water source would reduce impacts around the existing earthen reservoirs and distribute livestock more evenly throughout the allotment, giving the permittee more reliability and flexibility for use of this allotment in this grazing system.

Flat Top Well Allotment

The allotment is divided into two pastures and uses a deferred rotational grazing system. There are several earthen reservoirs on the allotment, but they are unreliable as they depend on rainfall events in order to fill, lack in water storage capabilities, and leak due to the soils' inability to retain water. Currently there is only one reliable water source in the West Pasture of the allotment, provided by a pipeline that extends from a BLM well near Colorado City.

The proposed pipeline extension would create one additional water source in the southwestern portion of the allotment that would provide reliable water for wildlife, and livestock use. This additional water source would aid in keeping livestock dispersed throughout the allotment at all times of the grazing season, which would result in more uniform utilization of forage (while not exceeding the maximum utilization level of 50%).

Antelope Spring Allotment

This allotment is divided into three pastures and uses a deferred rotational grazing system. There are several earthen reservoirs on the allotment, but they are unreliable as they depend on rainfall events in order to fill, lack in water storage capabilities, and leak due to the soils' inability to retain water. Currently, there are no reliable water sources in the South Pasture of the allotment.

In an effort to more uniformly distribute livestock, achieve more uniform utilization of key forage species, and give the permittee more reliability for pasture use in this grazing system, two water catchments and a water storage project are being proposed for the South Pasture of this allotment. These waters would also provide reliable water for wildlife.

The proposed storage tank would be near an existing spring. Currently, the spring produces ½ a gallon per minute, which is very little water on a short term basis when cattle are grazing this pasture. This is too little water to provide a reliable water source and keep cattle evenly distributed. However, on a long term basis, ½ a gallon per minute equates to 262,800 gallons a year. This project would install a storage tank of up to 100,000 gallons near the spring, and provide that reliable water source helping to keep cattle more evenly distributed

Two additional catchments have also been proposed, on opposite ends of the South pasture. These additional water sources would aid in keeping livestock dispersed throughout the allotment at all times of the grazing season, which would result in more uniform utilization of key forage species.

Having reliable water helps ensure that pasture rotations occur as planned, provide more reliable deferment and rest of pastures for vegetation, which should help maintain the desired plant composition objectives that were identified in the land health evaluation and therefore rangeland health within the pasture (see Section 4.1.1).

4.3.2 Impacts of Alternative B – No Action

Under the no action alternative, no new and reliable water sources would be constructed on any of the subject allotments. Livestock use in the Gunsight, Grama Point, Mainstreet, Quail Canyon, Wolfhole Mountain, Flat Top Well and Antelope Spring Allotments would continue to be distributed unevenly across the subject pastures – cattle would continue to graze primarily near current water sources, which would in turn continue to receive a disproportionate share of the grazing throughout the allotments and pastures. Overall utilization across each pasture would not exceed 50%, although this utilization would be unevenly distributed as other areas of the allotments would receive little grazing. The permittees would continue to round up the cattle and move them to other areas of each pasture, but the cattle would drift back to the areas nearest current water sources. In addition, not having reliable water sources would continue to make it difficult for the permittees to adhere to the established grazing systems during times when the earthen reservoirs are dry, due to the unreliability of scattered summer rainfall events and capabilities of reservoir storage.

4.4 CUMULATIVE IMPACTS

"Cumulative impacts" are those impacts resulting from the incremental impact of an action when added to other past, present, or reasonably foreseeable actions regardless of what agency or person undertakes such other actions. This section of the EA is intended to qualify and quantify the impacts to the environment that result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions. These impacts can result from individually minor but collectively important actions taking place over a period of time.

There are other uses and activities occurring on the lands within and adjacent to the project areas besides livestock grazing (i.e., recreation, mining, etc.). Specific actions that have occurred, are occurring, or are likely to occur in the reasonably foreseeable future include:

- Recreation – Recreation activities occurring throughout the project areas involve a broad spectrum of pursuits ranging from dispersed and casual recreation to organized, BLM-permitted group uses. Typical recreation in the region includes OHV driving, scenic driving, hunting, hiking, wildlife viewing, horseback riding, camping, backpacking, mountain biking, geocaching, picnicking, night-sky viewing, and photography. The Arizona Strip is known for its large-scale undeveloped areas and remoteness, which provides an array of recreational opportunities for users who wish to experience primitive and undeveloped recreation, as well as those seeking more organized or packaged recreation experiences.

- Northern Arizona Withdrawal – On July 21, 2009, the Department of the Interior published notice of the Secretary of the Interior's proposal to withdraw approximately 1 million acres of land in northern Arizona from locatable mineral entry under the Mining Law of 1872 [30 United States Code (USC) 22–54], subject to valid existing rights. On January 9, 2012, the Record of Decision was signed by the Secretary to implement the withdrawal. The withdrawal was in response to increased mining interest in the region's uranium deposits, as reflected in the number of new mining claim locations that were filed in the mid-2000s and concern over potential impacts of uranium mining to the Grand Canyon watershed, adjacent to Grand Canyon National Park. The Gunsight and Grama Point allotments project areas are included in the withdrawal area. Leasable and salable mineral resources are not subject to the withdrawal.

- Mining and Mineral Resources – Public lands on the Arizona Strip Field Office are generally open to mineral development (see above for a discussion on the Northern Arizona Withdrawal). The primary economic mineral resource in the area consists of locatable mineral deposits, including breccia pipe deposits (i.e., vertical collapse features formed from the collapse of karst solution caverns in the underlying Redwall limestone). A variety of precious metals (including copper and silver) are found within breccia pipes.

  However, it is the presence of uranium minerals within breccia pipes that has been of the most interest over the past half century. There is currently one uranium mine operating on

the Arizona Strip, the Arizona One Mine located west of Kanab Creek and approximately 35 miles southwest of Fredonia, Arizona (outside all of the allotments addressed in this EA). There are two uranium mines in various stages of reclamation, Kanab North and Pinenut, both also located west of Kanab Creek. A new uranium mine is proposed approximately 25 miles south-southeast of Colorado City, Arizona; development of this mine is subject to a validity determination due to its location within the Northern Arizona Withdrawal (see above). Should the associated claims be validated, and subsequently developed, approximately 20 acres would be disturbed at the mine site, along with associated infrastructure (powerlines and access roads).

Other potential mineral resources in the project areas are leasable minerals (including oil and gas, and geothermal resources) and salable minerals (consisting primarily of sand and gravel, and stone). In the vicinity of the project areas, the potential for geothermal resources is low and the potential for oil and gas is moderate; the potential for sand, gravel and stone is high. Several authorized mineral material sites occur in the vicinity of the project areas.

- Vegetation Treatments: Past Sagebrush Treatments: Between 1997 and 2010, sagebrush was treated in two of the eight allotments. The primary objective of these treatments was to decrease the density of sagebrush and allow for the increase in density, diversity and vigor of the native understory plant species (i.e., grasses and forbs) in areas dominated by sagebrush, thus improving the soil and moisture holding capabilities of the area. The allotments which received treatments were Grama Point and Mainstreet (see Table 4.2 for acreages treated within each allotment).

Table 4.5. Historic Sagebrush Treatments

Approximate Acres Treated			
Allotment	**Acres Treated**	**Total Acres in Allotment**	**% of Allotment Treated**
Mainstreet	15,576	188,106	8.2
Grama Point	1,329	23,585	5.6

4.4.1 Vegetation

Vegetation on the Arizona Strip has gone through dramatic changes since the 1870s due to historic land use practices and the introduction of non-native species. Livestock grazing would continue across the area on BLM-administered lands. The land health evaluation process would help ensure grazing practices are conducted in a manner to maintain or improve the ecological health of the area. This would also ensure diverse and natural plant communities are maintained, wildlife habitat is maintained or improved, erosion is reduced, and water quality is maintained.

The objectives developed to manage for healthy rangelands have a goal of keeping the entire ecosystem healthy and productive in order to ensure that it yields both usable products and intrinsic values, and rangeland management practices. In addition, practices currently being implemented (such as weed control efforts) would act to prevent and control the spread of invasive plant species.

Continuing gypsum and uranium mining in the region, as well as use of mineral material sites in the area, would cumulatively affect vegetation through the loss of vegetation, higher rates of erosion and sedimentation in drainages/waterways, increased deposition of dust on vegetation adjacent to roadways (i.e., haul routes), and introduction and spread of invasive plants. Reclamation activities would counter some of the reduction in vegetative cover, and preventative measures to inhibit the spread of invasive species could curtail infestation by species such as Scotch thistle.

The effects of the proposed range facilities have been analyzed under the "Direct and Indirect Effects" section of this chapter. Since livestock grazing occurs throughout the area, and range facilities are routinely constructed/maintained to support this grazing, it is reasonable to assume that impacts similar to those identified earlier in this chapter would occur elsewhere in the area. However, given the fact that neither of the alternatives proposes to increase the level of grazing or otherwise alter established grazing systems in any of the allotments addressed in this EA, it is anticipated that neither of the alternatives would result in cumulative impacts to vegetation resources when added to other past, present, and reasonably foreseeable activities in the area.

4.4.2 Wildlife, Including Big Game Species, Migratory Birds, and Sensitive Species

Wildlife may be affected by other activities occurring within and adjacent to the allotments addressed in this EA, including mineral development and various dispersed recreational activities. Mineral development has led to reduction of habitat quality and physical disturbance in a variety of habitats. Mining-related activities in the area include ongoing operations at the Arizona One mine, reclamation at Kanab North and Pinenut mines, all of which are located on the Kanab Plateau several miles outside of any of the subject allotments, and the potential for several additional future mines. Impacts to wildlife species from uranium mining activities were fully analyzed in the Northern Arizona Proposed Withdrawal EIS. This analysis stated that "Given the relatively small area of surface impact, it is anticipated that none of the alternatives [including the proposed withdrawal] would result in significant cumulative impacts to migratory birds [and wildlife resources] when added to other past, present, and reasonably foreseeable activities in the proposed withdrawal area" (BLM 2011).

Recreational pursuits, particularly off-highway vehicle (OHV) use, can cause disturbance to wildlife species and their habitats. Humans can disturb wildlife in a variety of ways. Disturbance can come from vehicle noise, wildlife being chased, or the mere presence of humans. Different species, and individuals within species, react differently to disturbances. The type of reaction also differs with time of year, location of disturbance in relation to breeding sites, type of disturbance, and duration of disturbance. With the increase in local populations has come a dramatic increase in the level of OHV use, resulting in increased disturbance, injury, and mortality to wildlife, particularly ground dwelling species with low mobility. Transportation corridors exist through

the habitat of virtually all species found within the allotments discussed in this EA. Impacts vary by species and by the location, level of use, and speed of travel over the road.

The effects of livestock grazing, including development and use if range improvements, on wildlife resources in the subject allotments have been analyzed under the "Direct and Indirect Effects" section of this chapter. Since livestock grazing occurs throughout the area, and range facilities are routinely constructed/maintained to support this grazing, it is reasonable to assume that impacts similar to those identified earlier in this chapter would occur elsewhere in the area. This additive impact may affect wildlife habitat or corridors by altering vegetation associations at specific locales. The vegetation communities in the area, and the health of the region as a whole, are important for the survival of many native species. However, given the relatively limited surface impacts from these activities, it is anticipated that cumulative impacts from past, present, and reasonably foreseeable future actions will not result in cumulatively significant impacts. In addition, neither of the alternatives proposes to increase the level of grazing or otherwise alter established grazing systems in any of the allotments addressed in this EA. It is therefore anticipated that neither of the alternatives would result in cumulative impacts to wildlife when added to other past, present, and reasonably foreseeable activities in the area.

4.4.3 Livestock Grazing

Livestock grazing in the region has evolved and changed considerably since it began in the 1860s, and is one factor that has created the current environment. At the turn of the century, large herds of livestock grazed on unreserved public domain in uncontrolled open range. Eventually, the range was stocked beyond its capacity, causing changes in plant, soil, and water relationships. Some speculate that the changes were permanent and irreversible, turning plant communities from grass and herbaceous species to brush and trees. Protective vegetative cover was reduced, and more runoff brought erosion, rills, and gullies.

In response to these problems, livestock grazing reform began in 1934 with the passage of the Taylor Grazing Act. Subsequent laws, regulations, and policy changes have resulted in adjustments in livestock numbers, season-of-use changes, and other management changes. Given the past experiences with livestock impacts on public land resources, as well as the cumulative impacts that could occur on the larger ecosystem from grazing on various public and private lands in the region, management of livestock grazing is an important factor in ensuring the protection of public land resources. Past, present, and reasonably foreseeable actions within the analysis area would continue to influence range resources, watershed conditions and trends. The impact of vegetation treatments, voluntary livestock reductions during dry periods, and implementation of a grazing system have improved range conditions. The net result has been greater species diversity, improved plant vigor, and increased ground cover from grasses and forbs.

In the long-term, as the population of the surrounding area increases (which would increase the use of public lands), conflicts between livestock grazing and these other uses could arise. Resolving conflicts may require adjustments and/or restrictions placed on livestock grazing management. Other factors also influence livestock grazing operations, such as climatic and market fluctuations. A six-year drought in the region occurred between 1998 and 2004 and dramatically affected

livestock grazing operations on the Arizona Strip, resulting in virtually all cattle being pulled from the public lands in 2004. Similar fluctuations in livestock numbers would likely occur in the future. However, since neither of the alternatives proposes to increase the level of grazing or otherwise alter established grazing systems in any of the allotments addressed in this EA, it is anticipated that neither of the alternatives would result in cumulative impacts to livestock grazing when added to other past, present, and reasonably foreseeable activities in the area.

Chapter 5

CONSULTATION AND COORDINATION

5.1 SUMMARY OF PUBLIC PARTICIPATION

This section summarizes the process used to involve individuals, organizations, and government agencies in the preparation of this EA. The public was notified of the proposed action by sending a scoping letter for the EA on August 10, 2016; this scoping letter was sent to all interested parties inviting public comments on the proposal to implement new rangeland improvement projects. A total of six comments were received. On November 1, 2016, a preliminary draft of the EA was sent to all interested parties inviting public comments on the proposal to implement new rangeland water development projects. A total of four comments were received. All comments received during development of the EA are summarized below in Table 5.1 along with a response to each comment.

Table 5.1. Public Comments and Responses

Name	Comment	Response
EA Scoping Comments		
Brian Wooldridge (USFWS)	Voiced concern that there are known populations of Siler pincushion cactus, and Fickeisen plains cactus in the general vicinity of the proposed projects. Also possible effects to Gierisch mallow were expressed.	Fickeisen cactus and Siler cactus do occur within some of the allotments where projects are proposed. The BLM is consulting with the USFWS on the proposed action on Fickeisen plains cactus and its critical habitat and Siler pincushion cactus. Gierisch mallow does not occur in any of the project areas and no potential for them to occur exists due to the lack of primary constituent elements that are needed for the mallow to exist.
The Hopi Tribe (Leigh J. Kuwanwisiwma, Director)	The Hopi Cultural Preservation Office supports the identification and avoidance of prehistoric archaeological sites, and we consider the prehistoric archaeological sites of our ancestors to be Traditional Cultural Properties. The Hopi Cultural Preservation Office requests consultation on any proposal with the potential to adversely affect prehistoric cultural resources on the Arizona Strip. If the cultural resources survey of the area of potential effect identifies National Register eligible prehistoric sites that may be adversely affected by project activities, please provide us with copies of the survey report and any proposed treatment plans for review and comment.	A Class III cultural resources inventory was conducted at each of the project areas – no sites were found. In addition, no known historic properties (sites eligible for or listed on the National Register of Historic Places) would be adversely affected by this project, so the Cultural Resource Project Records were not submitted to the Tribe.

Name	Comment	Response
Washington County Commission	Washington County supports these proposed projects that will increase water availability for both livestock and wildlife; improve range health by helping promote better livestock distribution, resulting in enhanced forage utilization.	No response necessary.
Mohave County Development Services (Christine Ballard, Planning & Zoning Divisional Manager)	We support the improvement of rangeland, including the pipeline extension and the new catchment basins. The only comment we have at this time is that public access to BLM lands on the strip should not be hindered due to the projects or as a part of the projects.	Public access would not be hindered by the implementation of these range improvements
State of Arizona Game and Fish Department (Craig McMullen, Regional Supervisor Flagstaff)	We want to extend our support for this project and commend the BLM for taking a proactive approach to wildlife and rangeland management through the development of these livestock and wildlife water facilities. These facilities provide an extensive benefit to a myriad of wildlife and livestock on the AZ Strip.	No response necessary.
The Navajo Nation (Kelly A. Francis, Navajo Culture Specialist)	After reviewing your consultation documents, the NNHPD has concluded the proposed undertaking/project area will not impact Navajo traditional cultural resources. The NNHPD, on behalf of the Navajo Nation has concluded that the proposed project may proceed at this time.	No response necessary.
Preliminary EA Review Comments		
Washington County Commission	Washington County Commission supports this type of project and very much appreciates the BLM for proposing to reconstruct this network of water lines and for proposing to construct the fourteen new water catchments. Even though the project lies in Arizona, we would like to offer our support as we see a benefit to Washington County as most of the grazing permittees reside here.	No response necessary.
Mohave County Board of Supervisors (Jean Bishop, Mohave County Board of Supervisors)	Mohave county appreciates the opportunity to comments on this EA. The County supports the improvement in range health and livestock distribution through the availability of a consistent water supply for both wildlife and livestock. Grazing and wildlife resources are important to the County's economy and our quality of life. Mohave County supports the Proposed	No response necessary.

Name	Comment	Response
	Action and any finding of no significant impact.	
State of Arizona Game and Fish Department (Luke Thompson, Field Supervisor AZ Strip)	We wish to extend our support for this project and commend the BLM for taking a proactive approach to wildlife and rangeland management through the development of these livestock and wildlife water facilities. These facilities provide an extensive benefit to a myriad of wildlife and livestock on the AZ Strip, and the importance of expanding the distribution of water resources cannot be understated. We look forward to the continues opportunity to engage with the BLM on this and future projects that advance sound conservation.	No response necessary.
Laura Welp, Western Watersheds Project Comment #1	The EA's statement of the purpose and need for the water developments cites the need to improve cattle distribution by moving them away from heavily used areas into more lightly used ones. However, it goes on to conclude that many resource values around the new projects will not be impacted by the increased cattle use because cattle were already using the area. For example, page 10 of the EA states that "It is important to note that cattle already can access the areas where improved livestock distribution is sought – the purpose for the proposed projects is to distribute cattle more evenly across each subject pasture for more uniform utilization, rather than to allow livestock grazing to occur in "new areas" which have never before been available to livestock use. No impacts from the proposed action are therefore anticipated." This ignores the fact that the project is designed to promote more use in these areas, so while the livestock impacts are not necessarily "new", they will be increased.	As stated in Section 1.2 of this EA, the purpose and need for these projects is to provide a reliable water source in those portions of the allotments which currently have unreliable water sources. Earthen reservoirs are the only water sources in these portions of the allotments. Earthen reservoirs are unreliable water sources, as they depend on rainfall events in order to fill, and lack in water storage capabilities. This unreliability of water affects the distribution of livestock and makes uniform grazing on the allotments difficult. The proposed water catchments and/or pipeline extensions and troughs would provide reliable water sources to the allotments – some would be new water locations while others would replace existing unreliable waters. It is important to note that the BLM is attempting to be pro-active (i.e., prevent management issues before they occur). The new waters would provide reliable year-round water for both livestock and wildlife, and would result in more uniform distribution of livestock and therefore more uniform utilization of forage. While use in some areas would increase (due to more even distribution across pastures), overall use of the pastures would not increase – i.e., overall utilization would not exceed the maximum allowable utilization level of 50% and no increases in active AUMs would occur. The BLM would continue to monitor the allotments to ensure that they continue to meet or progress toward meeting the Arizona Standards for Rangeland Health, including maintaining or improving the ecological condition of the plant communities.
Laura Welp, Western Watersheds Project Comment #2	We would like to see a more detailed and substantiated analysis of impacts on Endangered Species Act listed and BLM sensitive plant species. The EA puts forward	As described in Table 3.1 of this EA, there is one ESA listed species (Siler pincushion cactus) and one BLM sensitive plant species (*Rosa stellata*) present in the same pasture as several of the proposed project

Name	Comment	Response
	contradictory assertions in its analysis of the effects of new water development on these species. It says that the purpose of the developments is to more evenly distribute livestock use, which implies that cattle will be using range around the new developments more in the future. This necessarily implies greater impacts (herbivory, trampling, and increased exotics, for example) around the new developments. Yet the EA says that rare plant species in the area of the new development will not be affected because cattle grazing already occurs there, so there will be no additional impacts (see EA at pp 20-21 for example). This is a logical contradiction and cause for concern because there are two listed and two sensitive species, that, assuming the project is successful, will result in increased cattle use in the area of the populations. The BLM's analysis of No Impact is unsubstantiated and appears to rely on nothing other than speculation.	areas. It was determined that the proposed projects, while present in several of the same pastures as these species populations, would not have a discernible effect on these plants. In regards to Siler pincushion cactus, while we acknowledge that use in some areas would increase (due to more even distribution across pastures), long term monitoring indicates that this plant species has not been affected by livestock, but populations of are instead influenced by timing and amount of precipitation received. Through yearly monitoring of established plots, the BLM has determined that cattle have had minimal impacts to the species, even to those that occur much closer to water than that proposed in this EA (i.e., the Flat Top Well Allotment). For example, a plot located in the Atkin Well Allotment (outside any of the proposed project areas) is approximately 100 yards from an existing water and yearly monitoring has demonstrated trampling by livestock has only occurred on one cactus one time in this plot in 1994 . While the population of Siler pincushion cactus within the Flat Top Well Allotment is not regularly monitored, it is logical to conclude that this population would demonstrate similar lack of impacts from cattle trampling since the proposed trough would be located substantially further away from the cactus (one mile versus 100 yards). In regards to *Rosa stellata*, this plant occurs in three populations in the Grama Point Allotment, in the same pasture where the proposed projects would occur. These populations occur in the Timpoweap member of the Moenkopi Formation on the rim of Kanab Creek. However, the proposed catchments would be located in different soils, aspect, and topography than where this plant occurs and would completely avoid these populations. Installation of the catchments is designed to better distribute cattle in this allotment by providing reliable water sources. The proposed water catchments would be located in areas of existing disturbance – the proposed catchment nearest to where *Rosa stellata* occurs is at a site where range watering facilities already occur, although they are currently unreliable. It should also be noted that the populations of *Rosa stellata* occur on the edge of the canyon rim – areas not easily accessible to livestock – and the proposed projects would not change this situation (i.e., draw cattle to these areas). It has therefore been determined that

Name	Comment	Response
		the proposed water catchment projects, while present in the same allotment as these plant populations, would not affect this plant because it would not alter livestock movement patterns in the vicinity of where the plant occurs.
Laura Welp, Western Watersheds Project Comment #3	There are no references in the EA's citation list for any of the listed or sensitive plant species, and there is no botanist on the list of preparers. The BLM needs to reanalyze this issue with current information and provide citations of published, peer-reviewed data to back up claims that the project will have no effect on these species.	The BLM considers relevant literature when preparing its environmental analyses. The literature deemed relevant to this EA, and cited in the document, is listed in Chapter 6 of the EA. The BLM's Arizona Strip does not have a botanist on staff. However, there are vegetation specialists on staff (including the project lead for this EA) who are quite knowledgeable about plants, including special status plants, and conduct the annual special status plants monitoring.
Laura Welp, Western Watersheds Project Comment #4	The BLM wants to build a water catchment in the Toquer Tank allotment, which has known populations of and critical habitat for the Endangered Fickeisen plains cactus. The proposed development is in designated critical habitat about 0.4 miles from a known location. Since cattle impacts around water developments radiate out for up to two miles, this population is well within the potential impact zone. In addition to subjecting the plants to impacts from trampling, the season of use runs from November through May, which overlaps with the plant's flowering and fruiting period. In a species that already has a low reproductive output, further impacts to fecundity are contraindicated. Another error in analysis is the unsupported contention that the project will actually improve habitat for the plant. BLM says that it took a "hard look" at the project and determined that it would help livestock improve the plant's habitat, and thus had No Impact to the plant (EA p. 21). The BLM needs to reevaluate its contention that the project will not impact the cactus and will improve habitat conditions for it, since livestock trampling, along with other factors, is listed as a threat by the USFWS.	Regarding the project proposed on the Toquer Tank Allotment, the BLM acknowledges that this proposed catchment apron would be located within designated critical habitat of the Fickeisen plains cactus. The proposed catchment apron would have affected approximately one acre of designated critical habitat for this cactus. The apron would have covered up soil and native vegetation that serves to protect the soil and provides habitat for pollinators, causing a direct loss of that acre of critical habitat. The BLM is reassessing the need for this project, and is therefore not proceeding with analysis of the project at this time. As a result, the Toquer Tank Allotment proposed water catchment apron project has been removed from the analysis of this EA. If this project is reinitiated at some future time, a separate EA will be prepared to analysis impacts to resources, including the Fickeisen plains cactus.
Laura Welp, Western Watersheds Project Comment #5	If habitat condition is a concern, the BLM should note that the Toquer Tank allotment is not meeting rangeland health standards. "Some pastures lack dependable water, which inhibits proper livestock distribution" and "makes it difficult to follow the grazing cycle." Infrastructure would "allow the… permittee more reliability in adhering to the	As stated in the response to WWP Comment #4, the proposed Toquer Tank project has been removed from the proposed action, and from the analysis in this EA.

Name	Comment	Response
	grazing system established in the AMP" (EA p. 55). The EA appears to admit that the permittee is not following the grazing system established in the AMP, which implies that noncompliance is a factor in failure to meet. If cattle distribution was a problem then they should have been encouraged to move to more lightly used areas with active management. Rather than adjust grazing to allow resources to recover, the BLM instead proposes to install a water development, rewarding poor management at the expense of taxpayers and potentially impacting a listed species.	
Laura Welp, Western Watersheds Project Comment #6	A pipeline and trough are proposed about a mile from Siler pincushion cactus. BLM asserts that "…this plant has not been affected by livestock…" (EA p. 21). Actually, according to a 2007 USFWS Biological Opinion, grazing is among the threats to the species, although it can be mitigated to the point that USFWS characterizes the threat as "often minor". It is important to understand that the BLM has agreed to these conservation measures. These include: "… continuing evaluation of monitoring plots, expanding surveys in areas of potential habitat, prohibiting OHV use off established roads in occupied habitat, and reducing livestock use during drought periods." However, the report also says that "BLM is exercising its authorities to minimize direct effects from livestock grazing on Siler pincushion cactus, but the effects are not being eliminated." It's true that there are other factors leading to the decline of this species (beetle herbivory, drought, climate change) but even minor impacts from increased trampling and livestock herbivory can have an effect on a species teetering on the brink. The precautionary principle should be enacted here.	While USFWS cites grazing as a threat to Siler pincushion cactus, BLM's long-term monitoring of the species on the Arizona Strip indicates that livestock have had minimal impacts to the species, but rather populations of this plant are influenced by timing and amount of precipitation received instead. In fact, the 2007 Biological Opinion (BO) cited by the commenter concluded that "The extent of injury and mortality of individual Siler pincushion cactus due to the [continuation of livestock grazing] is anticipated to be low" and "The extent of modification of Siler pincushion cactus due to the [continuation of livestock grazing] is anticipated to be low" (USFWS 2007). As part of the consultation process, the BLM developed conservation measures to reduce the potential for adverse effects from continued livestock grazing. These include continuing evaluation of monitoring plots, expanding surveys in areas of potential habitat, prohibiting ATV use off established roads in occupied habitat, and reducing livestock use during drought periods. The BLM has made significant efforts to conserve Siler pincushion cactus, including conducting extensive surveys of habitat, documenting locations where plants have been found, establishing long-term monitoring plots that continue to be monitored on a yearly basis, limiting ATV use to existing or designated routes, and reducing use during drought periods. The proposed pipeline route has been surveyed by the special status plants specialist and no cacti were found within the proposed pipeline route or proposed trough location. Thus, there would be no direct effects to Siler pincushion cactus. See also response to WWP Comment #2.

Name	Comment	Response
Laura Welp, Western Watersheds Project Comment #7	Please include in the final EA how the AZ Strip is meeting the requirements specified in the 2007 Siler pincushion cactus USFWS Biological Opinion. Is it meeting with USFWS annually to discuss grazing management in the allotments with Pediocactus populations, for example?	In 2007, USFWS issued a BO on the effects of livestock grazing on all allotments within Siler pincushion cactus habitat (USFWS 2007). As part of the formal consultation process with USFWS, the BLM developed several conservation measures to reduce the potential for adverse effects to Siler pincushion cactus from livestock grazing. These include continuing evaluation of monitoring plots, expanding surveys in areas of potential habitat, prohibiting ATV use off established roads in occupied habitat, reducing livestock use during drought periods, and providing annual monitoring reports to USFWS (there is no requirement for an annual meeting). The BLM is implementing all of these requirements.
Laura Welp, Western Watersheds Project Comment #8	Black Rock Daisy (*Townsendia smithii*) is on the BLM Sensitive Species list and protected by the Arizona Native Plant law. It persists in a very narrow range in the Black Mountains and is known only from five populations, two of which are a half mile from a proposed water catchment, well within the zone of impact created by a new water source. In addition, the species occurs on the Wolfhole Mountain allotment, a single pasture grazed in June every year. The plant flowers and fruits in April, May, and June, so cattle impacts to reproductive output are possible and should be analyzed in the EA. The EA dismisses the idea that grazing has an effect on resources by contending that "cattle already can access the areas where improved livestock distribution is sought" and the BLM will "not introduce grazing into an area where it has not previously occurred". This ignores that fact that the whole point of "improved distribution" means more cattle in these areas, which equates to increased trampling and herbivory. It is incumbent on the BLM to explain why increasing cattle impacts will not affect this species. The NI determination should be reevaluated in the final document. The AZ Strip Field Office is compelled to manage grazing so as to not cause the plant to become listed as Endangered. The plant meets many of the criteria for listing as it is.	The Black Rock daisy *(Townsendia smithii)* was on the 2005 BLM Arizona sensitive species list. However, in 2008, the BLM Manual Section 6840 was revised and the criteria for determining sensitive changed. The revised criteria state that species designated as Bureau sensitive must be native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management, and either: 1. There is information that a species has recently undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range; or 2. The species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk (BLM 2008c). BLM Arizona determined that the species did not meet the new criteria because although the species has a very narrow range, populations appeared to be stable and there were no known threats. As a result, the species was not included on the most recent (2010) Arizona BLM sensitive species list (BLM 2010). In addition, Arizona State status for this species is currently listed as “none.” Discussion on this species has therefore been removed from Table 3.1of the EA.
Laura Welp, Western Watersheds Project Comment #9	The BLM should take a site-specific hard look at the effect of fencing on wildlife movements, wildlife corridors, predator/prey relations, ground disturbance and burrow	There is no fencing proposed in this EA other than around the catchment aprons and storage ponds which would not hinder wildlife movements, corridors or predator/prey relationships. Impacts

Name	Comment	Response
	impacts. The BLM should also consider the effects of increasing water availability, which can create artificial and unsustainable occupation patterns that depend on the subsidy. Wildlife doesn't need supplemental waters unless the natural waters have been impacted (e.g. pumped out for livestock waters).	from ground disturbance are analyzed in the EA. Water is essential for all animals. Wildlife populations in general, and mule deer and migratory birds in particular, depend on reliable water sources. When ambient temperatures are high, it is reasonable to assume that survival and productivity of wildlife could be adversely affected by a lack of water. In semi-arid regions, such as the project areas addressed in this EA, water developments can be beneficial in combination with adequate foraging areas (Rosenstock et al. 1999). Wildlife will traditionally use water catchments during the hottest, driest months of the year when natural water sources dry up. For example, the *Arizona Strip Interdisciplinary Mule deer Management Plan 2015-2019* states, "Significant efforts have been implemented across the Arizona Strip to improve water distribution. Perennial sources are generally lacking, and man-made sources such as livestock tanks, water catchment facilities and spring developments provide the bulk of water sources available for mule deer. It has been demonstrated on the Arizona Strip that improving water distribution improves distribution and habitat use by mule deer and has positive impacts on populations." The *Arizona Strip Interdisciplinary Mule deer Management Plan 2015-2019* also states that "water distribution should be improved in [Units 12B, 13A, and 13B] by utilizing both cooperative projects and wildlife catchments" (AGFD and BLM 2015). The Arizona Statewide Pronghorn Management Plan (AGFD 2009) identifies a number of management objectives, including objectives related to water availability. It should be noted that other wildlife species (along with mule deer and pronghorn) would also benefit from the proposed water projects by improving water distribution for these species as well, which are also objectives contained within the Arizona Strip Field Office RMP (BLM 2008a).
Laura Welp, Western Watersheds Project Comment #10	BLM should take a comprehensive view of the problems wildlife are facing on the allotment(s) and assess whether the proposed action will improve or harm them.	The environmental effects to wildlife are fully analyzed in the EA (Chapter 4). This analysis includes anticipated direct, indirect, and cumulative impacts. See also response to WWP Comment #9 (above).
Laura Welp, Western Watersheds Project Comment #11	For the EA to say that the project will have No Impact on invasive, non-native species is incorrect (EA p 23). Even a casual drive through the project area shows vast fields of cheatgrass, and any new surface disturbance	We acknowledge that cheatgrass occurs in some areas within allotments/pastures where the projects are proposed. However, it is not present in vast monocultures. As described in Table 3.1 of this EA, proper range practices can help prevent the spread of

Name	Comment	Response
	will facilitate non-native species infestations, which in turn affects forage species for wildlife, increases flammability, and outcompetes native plants. Grazing has been positively correlated with the spread of exotics. It reduces native plant abundance and increases bare ground.	undesirable plant species, and the presence of stable plant communities serve to suppress the expansion of invasive plants. As stated in Section 1.2 of this EA, the purpose and need for these projects is to provide a reliable water source in those portions of the allotments which currently have unreliable water sources in order to promote more uniform distribution of livestock and therefore more uniform utilization of forage. This would result in maintaining or improving the ecological condition of the plant communities (see EA Section 4.1. for a detailed discussion on anticipated impacts to vegetation in the project areas. It is also important to note that removal of grazing by domestic livestock does not automatically lead to disappearance of cheatgrass (Young and Clements 2007), and that cattle already can access the areas where improved livestock distribution is sought – our purpose for the proposed projects is not to open up "new areas" to livestock use but rather to distribute cattle more evenly across each subject pasture for more uniform utilization. Thus the conclusion that the Proposed Action would have no discernible impact on noxious weeds or invasive species.
Laura Welp, Western Watersheds Project Comment #12	The goal of "improved distribution" is really just relocating the impacts of livestock grazing to previously less disturbed areas. If "even more forage utilization" is a goal of the BLM, it should be explained how this will affect the allocation of forage/vegetation to wildlife.	The proposed projects are within grazing allotments that are available for livestock use within the Arizona Strip Field Office RMP, and that have current, valid grazing permits. As such, utilization of up to 50% of current year's growth can occur on all parts of the allotments. Note that this 50% utilization is averaged across an entire use area (generally on a pasture basis). Thus, while it is true that certain areas would have increased utilization due to more even distribution of livestock, overall utilization would not exceed the prescribed utilization limit of 50%. The BLM would continue to monitor the allotments to ensure that they continue to meet/progress toward meeting the Arizona Standards for Rangeland Health, including maintaining or improving the ecological condition of the plant communities. (See EA Section 4.1. for a detailed discussion on anticipated impacts to vegetation in the project areas.) The amount of forage identified as available for livestock on these allotments (expressed in AUMs) is a land use plan decision and was established in the Arizona Strip RMP. This action is therefore not appropriate for analysis in this EA. Please note that one of the stated purposes of the proposed action is "more uniform distribution of

Name	Comment	Response
		livestock and thus more even use within the pasture" (emphasis added), not "even more … utilization." As stated above, the maximum allowable utilization on these allotments is 50% of current year's growth, and that would not change under the proposed action.
Laura Welp, Western Watersheds Project Comment #13	BLM should analyze whether the grazing regimes that presently exist on the allotment can be sustained without the additional infrastructure or whether adjusting the current grazing use level downward would accomplish the same thing. Water developments are not a substitute for active management. Adding new infrastructure to disperse impacts may only impact the new areas without correcting problems in old areas. This is particularly true if livestock are not actively managed, which is typical for operators in this region.	As stated in the response to WWP Comment #1, the purpose and need for these projects is to provide reliable water sources for livestock and wildlife. The BLM considered all reasonable alternatives that would meet this stated purpose and need – this resulted in Alternative A (Proposed Action). The analysis of impacts to current livestock grazing management without the additional livestock water facilities (No Action) is addressed in EA Section 4.3.2. The BLM also considered another alternative which consisted of constructing earthen reservoirs. Under this alternative, earthen reservoirs would be constructed instead of installing pipeline extensions and new water troughs. This would likely not result in reliable water sources due to the scattered, unreliable rainfall events that tend to occur on the Arizona Strip. Construction of reservoirs would also create a larger area of disturbance on vegetation and soil. The success of these reservoirs would be a risk regarding holding capabilities based upon the soil type in which they would be built and that soil's ability to retain water. This alternative would therefore not address the purpose and need for action so was eliminated from detailed analysis. No other alternatives were identified that would meet the purpose and need for action. The BLM did not include an alternative on reducing current livestock use levels – this issue would be addressed during the permit renewal process for each allotment. The proposed projects are within grazing allotments that are available for livestock use within the Arizona Strip Field Office RMP, and that have a current, valid grazing permit. The grazing permit is the instrument that authorizes a particular use (including amount of grazing preference) of an allotment. The issue of considering reduced livestock numbers would be addressed during the permit renewal process, when a variety of information (including the land health evaluation) is considered and evaluated. It should be noted that there must be valid data to suggest that reducing livestock use is warranted. Current monitoring data does not suggest that a reduction in grazing preference is necessary – none of the land health

Name	Comment	Response
		evaluations completed for the subject allotments indicated that livestock grazing was causing non-attainment of land health standards (see EA Section 3.2.1.1). The BLM would continue to monitor the allotments to ensure that desired resource conditions are met, and that the allotments meet (or are making progress toward meeting) the Arizona Standards for Rangeland Health, including maintaining or improving the ecological condition of the plant communities. (See Section 4.1.1 for a detailed discussion on anticipated impacts to vegetation in this allotment.)
Laura Welp, Western Watersheds Project Comment #14	WWP does not agree that there will be no impact to socioeconomic values as a result of this project (EA p. 27). The analysis of the economic impacts of the water developments should be expanded to include costs to taxpayers, not just local economies or permittees. Who is paying for the range developments and who will have ownership of them? Any cost-sharing arrangement with the taxpayers' money should be disclosed and the new developments' costs should be explicitly quantified. The BLM should identify the funding source and whether the contract for any funding has already been completed.	As stated on page 1 of the EA, the BLM is not funding the installation of these proposed projects; funding would be by the permittees, along with possible funding by the Arizona Strip Grazing Board. In addition, maintenance of the projects would be the responsibility of the permittee, not the government. Thus, the BLM concluded that the projects would have no impact to socioeconomic values.
Laura Welp, Western Watersheds Project Comment #15	The final EA should describe mitigation measures and monitoring plans to ascertain whether these developments are improving or degrading resource conditions in the new areas. Monitoring should be conducted to establish that the goal of dispersing impacts is being achieved. The assertion that the new waters will redistribute impacts must be verified with objective, quantitative data, not simply the qualitative and often-biased rangeland health assessments. The EA states that "…rangeland monitoring (to evaluate compliance, utilization, composition, and long-term trend) would continue in these affected pastures and allotments which would help determine the effectiveness of the projects" (EA p 18). However, in practice this routine monitoring often does not take place as scheduled and would not be adequate to monitor the effects of the projects. Instead, the final EA should include annual monitoring plans for each development five years following installation. The BLM's Assessment,	The proposed action described in this EA includes a section on "Best Management Practices" (Section 2.1.1) and "Monitoring" (Section 2.1.2). Rangeland monitoring would continue in these affected pastures and allotments, which would help determine the effectiveness of the projects. The BLM conducts a variety of monitoring – long-term (trend) monitoring and composition data collection is performed every five years; allotment inspections and utilization monitoring generally occur every 1-2 years. The BLM regularly monitors trend, species composition, and percent ground cover at key areas across the subject pastures. The placement of these existing key areas, and subsequent data gathered at each monitoring site, would be sufficient to determine whether each project goal is achieved, regardless of whether the infrastructure is new or replacing unreliable water sources. This future monitoring would also demonstrate any changes to land health in this area, as a result of the proposed water projects.

Name	Comment	Response
	Inventory, and Monitoring protocol contains good methods to follow, particularly the line intercept method for measuring amounts of bare ground and other ecological functions. Data should be gathered before the project is implemented and then subsequent monitoring of the newly impacted areas around the new infrastructure should be undertaken to assure that the projects are not resulting in additional resource damage to the new areas.	
Laura Welp, Western Watersheds Project Comment #16	Soil resources are listed as NI in the Affected Environment section, but it's reasonable to assume that increased surface disturbance from project installation and increased cattle use will result in increased bare ground, reduced biological soil crust, and increased erosion.	Surface disturbance from the projects would be negligible – as shown in Table 4.1 of the EA, acres disturbed in each allotment ranges from a low of 0.010% (Mainstreet Allotment) to a high of 0.042% (Grama Point Allotment). However, biological soil crusts are not present at all of the project areas. Of the 14 new water catchments proposed, four would be constructed in areas where biological soil crusts occur: • Mainstreet Mudhole #2 • Mainstreet Round Pond • Mainstreet Higley • Antelope Spring #1. It has been emphasized throughout this EA that no changes in permitted use or increases in utilization limits would be authorized as a result of these projects. While use in some areas would increase (due to more even distribution across pastures), overall use of the pastures would not increase – i.e., overall utilization would not exceed the maximum allowable utilization level of 50%. In addition, all of the troughs would be either located next to existing reservoirs or along existing roads, and all of the proposed pipeline locations would also be along existing roads, where disturbance to soils has already occurred. Thus, livestock concentration near water would also occur in areas where soil has already been disturbed. The BLM would continue to monitor the allotments to ensure that they continue to meet or progress toward meeting the Arizona Standards for Rangeland Health, including upland soils exhibiting permeability and infiltration rates that are appropriate to soil type (Standard 1). Cattle already can access the areas where improved livestock distribution is sought – the purpose for the proposed projects is not to open up "new areas" to livestock use but rather to distribute cattle more evenly across each subject pasture for more uniform utilization. Thus, the BLM

Name	Comment	Response
		has concluded that there would be negligible impacts to soils from implementing these proposed projects.
Laura Welp, Western Watersheds Project Comment #17	Please analyze the effects of the proposal on hydrological processes - How will the new water developments affect groundwater or nearby springs?	The EA determined there would be no effects to ground water because all but two of the proposed water facilities would utilize surface water (to include water coming from existing catchments) as the water source. The other two water sources are an existing well (to which the permittee has water rights) and Ruesch Spring. Ruesch Spring is a man-made horizontal artesian seep developed in the early 1900s to collect water into a pipe underground and delivers the water into a trough, the overflow currently runs over the trough and sinks back into the ground. There would be no changes to groundwater pumping or groundwater flow as a result of the proposed action.
Laura Welp, Western Watersheds Project Comment #19	The EA states that "The purpose of the proposed pipeline and water catchment projects is to increase water availability for both livestock and wildlife while also improving rangeland health by promoting better livestock distribution which would result in more even forage utilization." Five of the eight allotments already meet AZ Standards for Rangeland Health, and the others are making progress toward meeting, so it appears that it is not necessary to go to the taxpayer expense, soil disturbance, fencing impacts, and other resource degradation that developing unneeded waters will introduce if rangeland health is being maintained without them.	While most of the allotments analyzed within this EA already meet land health standards, the proposed projects would still be beneficial to land health – reliable water sources would result in more uniform distribution of livestock and thus more uniform utilization of forage (while not exceeding the maximum utilization level of 50%), which is one the stated purposes and needs for the projects. Having reliable water helps ensure that pasture rotations would occur as planned, providing more reliable deferment and rest for pastures and thus periodic rest for vegetation. Simply because an allotment meets rangeland health standards does not negate the need for active management to (among other things) improve livestock distribution which would maintain soil health and desired vegetation standards into the future. As such, the BLM is attempting to be pro-active (i.e., prevent management issues before they occur).
Laura Welp, Western Watersheds Project Comment #20	The EA discusses the lack of functionality of some earthen dams on the Gunsight Allotment and says that they need to be replaced. Will the bare soil be restored to prevent weed spread? The EA says that desired resource conditions not met in some areas because sagebrush density is too high and herbaceous cover is too low, a common problem in western rangelands. (Usually soil and hydrologic functions are also impaired when this occurs, but the EA states that these factors are meeting standards.) However, the analysis errs in saying that "…current livestock grazing was not the causal factor for not meeting but instead it was due to the high composition of sagebrush and	Although the earthen dams do not provide a reliable source of water (as described earlier in this EA), they still provide a function to the allotment by slowing down flash flooding and providing some erosion control. Therefore, these earthen dams would not be removed but would be left in place to continue to serve this purpose. There are a variety of factors influencing the increase in shrubs and decrease of grasses on this particular site, including the slope and aspect of a site, different soil inclusions and precipitation. Recent precipitation patterns have resulted in the frequency of grasses decreasing while shrubs have increased because species such as sagebrush have strong and deep tap roots that help the plants maintain or

Name	Comment	Response
	corresponding low composition of herbaceous species" (EA p 29). The EA needs to state the cause of the departure from expected condition as well as describing it. Most published, peer-reviewed research cites livestock grazing and reduced fire frequency as contributing to the skewed functional group composition we see so often in arid rangelands in the west.	increase under a dry climate regime. All of these factors indicate that the increase in shrubs is due to factors other than grazing.
Laura Welp, Western Watersheds Project Comment #21	The EA says that water developments are necessary in the Grama Point Allotment because it will "allow the permittee more reliability in adhering to the grazing system established in the AMP". Does this imply that the permittee is not following the AMP? If so, why is he being rewarded for noncompliance with water developments? Increasing water developments is only part of the story. Without active management and proper attention cattle won't necessarily comply with desired movement patterns on their own. Providing water to permittees should require a reciprocal commitment to active management.	The water catchments proposed for this allotment are strategically located to replace existing nonfunctioning water developments as stated in the EA (Section 4.3.1). While not in the exact footprint of the existing reservoirs, they are in the general vicinity within the pastures to promote uniform livestock distribution. The permittee does follow the grazing system established in the AMP, but currently must haul water because the existing water sources are no longer functional. This creates unreliable waters for both livestock and wildlife – having functional, reliable water sources on the allotment would provide the land manager along with the grazing permittee a more reliable grazing system and result in more uniform livestock distribution and utilization of forage. These benefits from the range improvement would therefore result in improving or maintaining rangeland health.
Laura Welp, Western Watersheds Project Comment #22	The EA proposes to install a storage tank and trough at Ruesch Spring and pump water from the spring to the tank (EA pp 42-43). It isn't clear if the BLM will completely dewater the spring or if some flow would be left to maintain riparian function in the spring. Please clarify that the spring will not be completely dewatered by this project.	Reusch Spring is a man-made spring (developed in the early 1900s to) which the permittee owns the water rights. It has no riparian properties – water is collected in a pipe underground and flows into a trough. The storage tank would not alter the collection of water, but would allow the water to be stored and used by livestock and wildlife year round.
Laura Welp, Western Watersheds Project Comment #23	The document references the AZ Standards of Rangeland Health and which allotments are meeting standards. It would be helpful to have the hard data in the final EA. Please include rangeland health information along with trend, utilization, and any other monitoring data available.	The monitoring data used to prepare each land health evaluation for the allotments addressed in this EA is quite extensive and is therefore not included in this EA. The summary determination/recommendation is presented instead, which is the relevant information applicable to this current EA analysis.
Laura Welp, Western Watersheds Project Comment #24	Putting in new infrastructure should not always be the default solution to solving resource problems. The resource improvement sought by redistributing impacts might be more cheaply and easily attained by reducing stocking rate, for example. Allotments could be combined to facilitate rest rotations instead of deferred rotations so pastures are rested longer.	See response to WWP Comment #13. Installing a rangeland water development alone does not improve rangeland health. However, it does provide the land manager along with the grazing permittee a more reliable grazing system and result in more uniform livestock distribution and utilization of forage. These benefits from the range improvement would therefore result in improving or maintaining rangeland health.

Name	Comment	Response
	Growing season grazing use could be eliminated. In fact, if an allotment can't support livestock without such a large amount of infrastructure that is a good indication it is not suitable for grazing. Reducing grazing makes better sense both economically and biologically.	
Laura Welp, Western Watersheds Project Comment #25	WWP suggests strongly that the rare plant species in the area should not be subjected to any increased stressors. This project, by attracting more cattle to plant populations, is very likely to introduce increased herbivory and trampling.	See response to WWP Comment #2.
Laura Welp, Western Watersheds Project Comment #26	We are concerned that grazing over a wider area of the Monument enabled by the new range structures will create more disturbance and more habitat for weeds to expand even further, which would be catastrophic in areas already dominated by flammable annual exotics.	None of the improvements in this EA are located in a national monument (see EA Section 3.1). As for concerns regarding weed expansion, see response to WWP Comment #11.
Laura Welp, Western Watersheds Project Comment #27	An increase in trampling increases soil erosion and loss of biological soil crust.	See response to WWP Comment #16.

5.2 LIST OF PREPARERS AND CONTRIBUTORS

The following tables list persons who contributed to the preparation or review of this EA.

Table 5.2. List of BLM Preparers/Reviewers

Name	Title	Responsible for the Following Program
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Lorraine Christian	Arizona Strip Field Office Manager	Project Oversight
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Jace Lambeth	Rangeland Management Specialist	Project Lead – Rangeland Management, Special Status Plants
Mike Cutler	Rangeland Management Specialist	Rangeland Management
Brian McMullen	Soil Scientist	Soil, Water, Air

Richard Spotts	Environmental Coordinator	NEPA Compliance
Shawn Langston	Wildlife Biologist	Wildlife Management
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John Sims	Supervisory Law Enforcement	Law Enforcement
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Table 5.3. Non-BLM EA Reviewers

Name	Agency/Organization	Title
Devin Ruesch	Rancher	Grazing permittee on Antelope Spring Allotment
C.A. Griffiths & Sons	Rancher	Grazing permittees on Gunsight Allotment
Rudger C. Atkin, Inc	Rancher	Grazing permittee on Mainstreet Allotment
Ray Spencer	Rancher	Grazing permittee on Grama Point Allotment
Sunshine Cattle Co.	Ranchers	Grazing permittee on Quail Canyon Allotment
Foremaster Ranches LLC.	Rancher	Grazing permittee on Flat Top Well Allotment
Gubler Ranches LLC.	Rancher	Grazing permittee on Wolfhole Mountain Allotment
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Chapter 6

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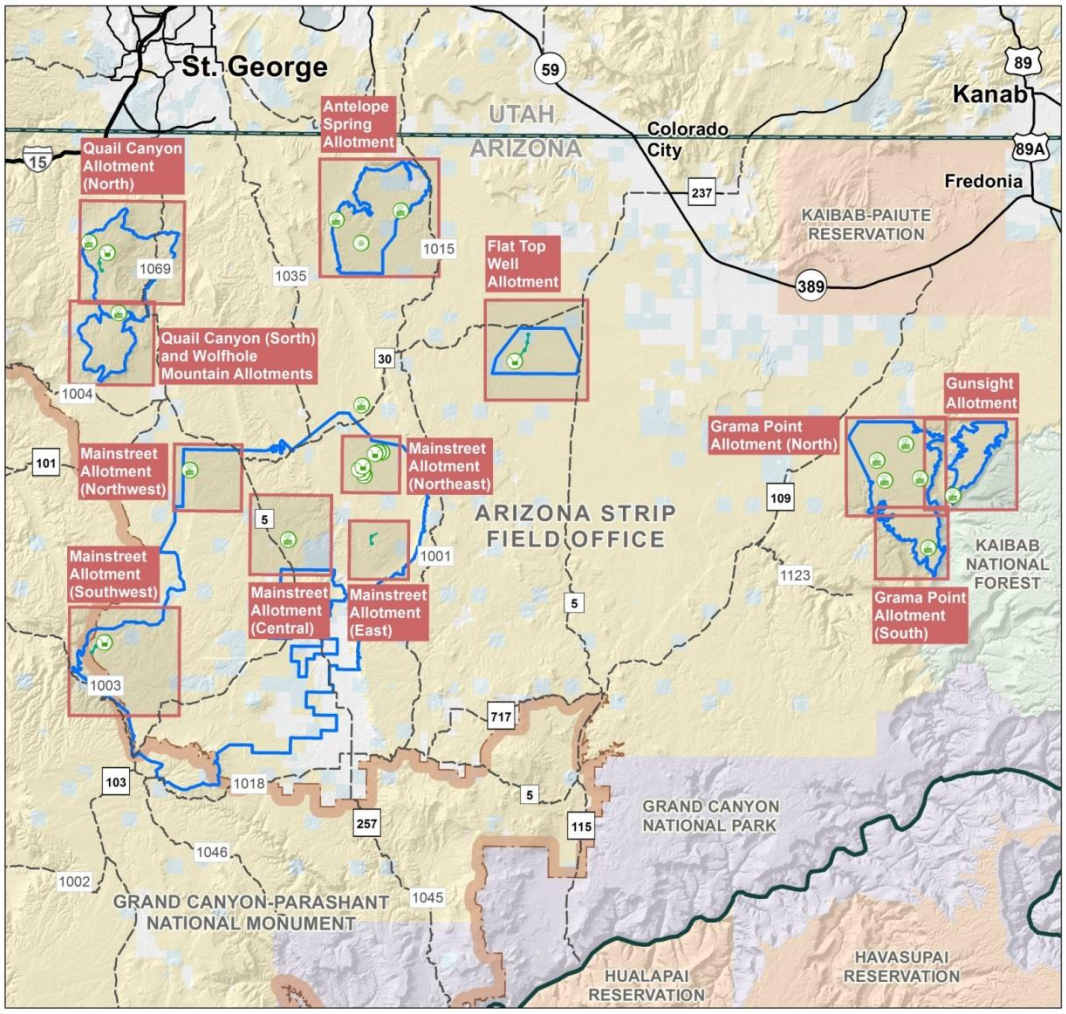
List of Acronyms

AGFD	Arizona Game and Fish Department
AMP	Allotment Management Plan
AUM	Animal Unit Month
BLM	Bureau of Land Management
BMP	Best Management Practice
CFR	Code of Federal Regulations
DPC	Desired Plant Community
EA	Environmental Assessment
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
NEPA	National Environmental Policy Act
OHV	Off-Highway Vehicle
RMP	Resource Management Plan
TGA	Taylor Grazing Act
USC	United States Code
NRCS	Natural Resource Conservation Service
FLPMA	Federal Land Policy Management Act
EIS	Environmental Impact Statement
DR	Decision Record
VRM	Visual Resource Management

Appendix A

Arizona Strip Field Office - Proposed Water Development Projects for Grazing
Project Area Map Index
NEPA No. DOI-BLM-AZ-A010-2016-0027-EA

Bureau of Land Management - Arizona Strip Field Office



Proposed Developments

- Catchment
- Storage Tank
- Trough
- Proposed Pipeline

- Extent of Individual Project Map
- Grazing Allotment
- National Monument

Surface Management

- Bureau of Land Management
- State
- Private
- National Park Service
- US Forest Service
- Indian Reservation

Transportation Routes

- Interstate Highways
- Principal Paved Highways
- Other Paved Roads
- Unpaved Roads

0 5 10 Miles
0 5 10 Kilometers

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Data Sources
All layers: BLM and ASDO Geodatabases

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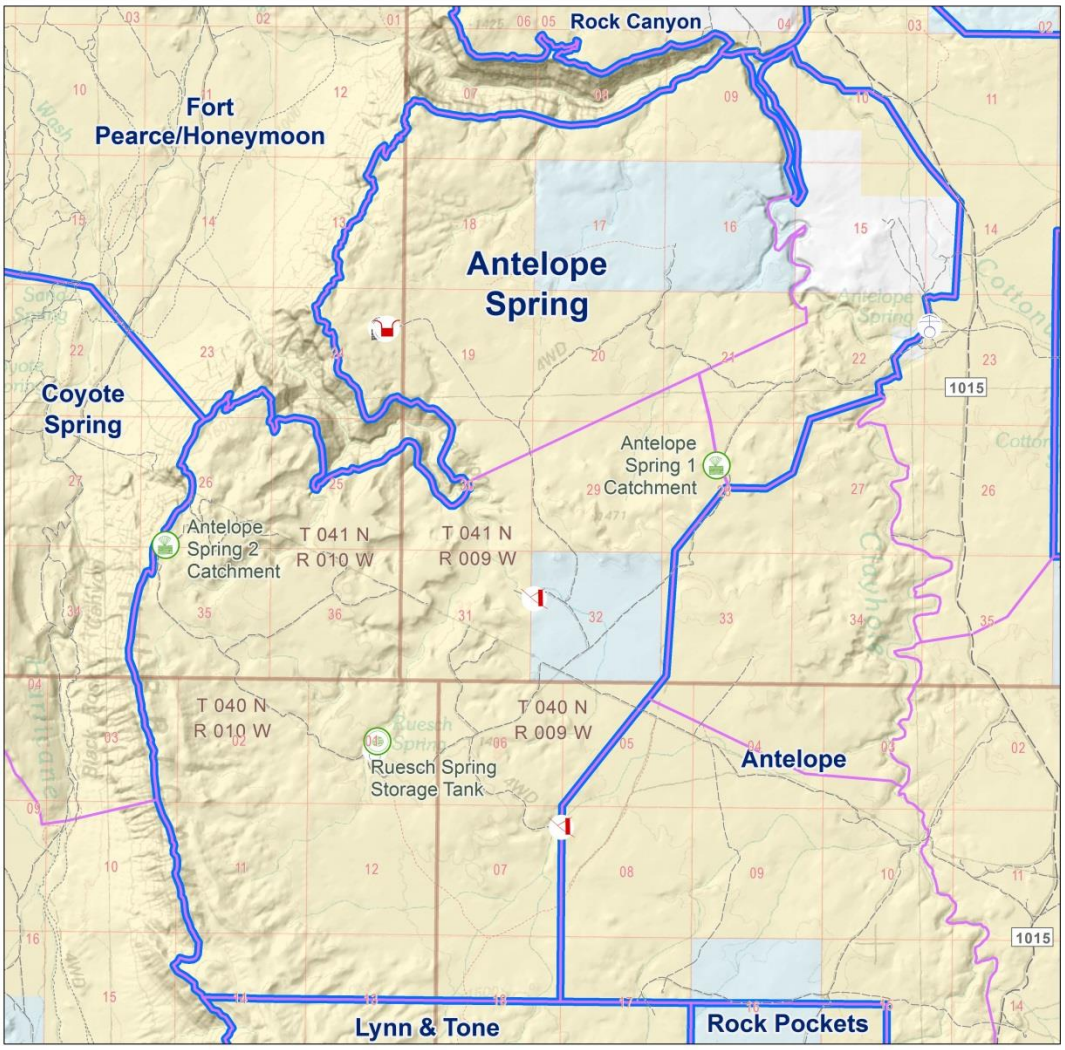
BLM

Arizona Strip District

Antelope Spring Allotment - Proposed Developments
NEPA No. DOI-BLM-AZ-A010-2016-0027-EA
Bureau of Land Management - Arizona Strip Field Office



Proposed Developments
- Catchment
- Storage Tank

Existing Developments
- Developed Spring
- Livestock Catchment
- Livestock Trough
- Unfenced Reservoir
- Water Storage Tank

Grazing Boundaries
- Allotment
- Pasture

0 0.5 1 Miles
0 0.5 1 Kilometers

Public Land Survey System
- PLSS Township
- PLSS Section

Surface Management
- Bureau of Land Management
- State
- Private

Transportation Routes
- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track
- Reclaiming

Map Produced by: BLM - Arizona Strip District GIS Program
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Data Sources
All layers: BLM and ASDO Geodatabases

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BLM
Arizona Strip District

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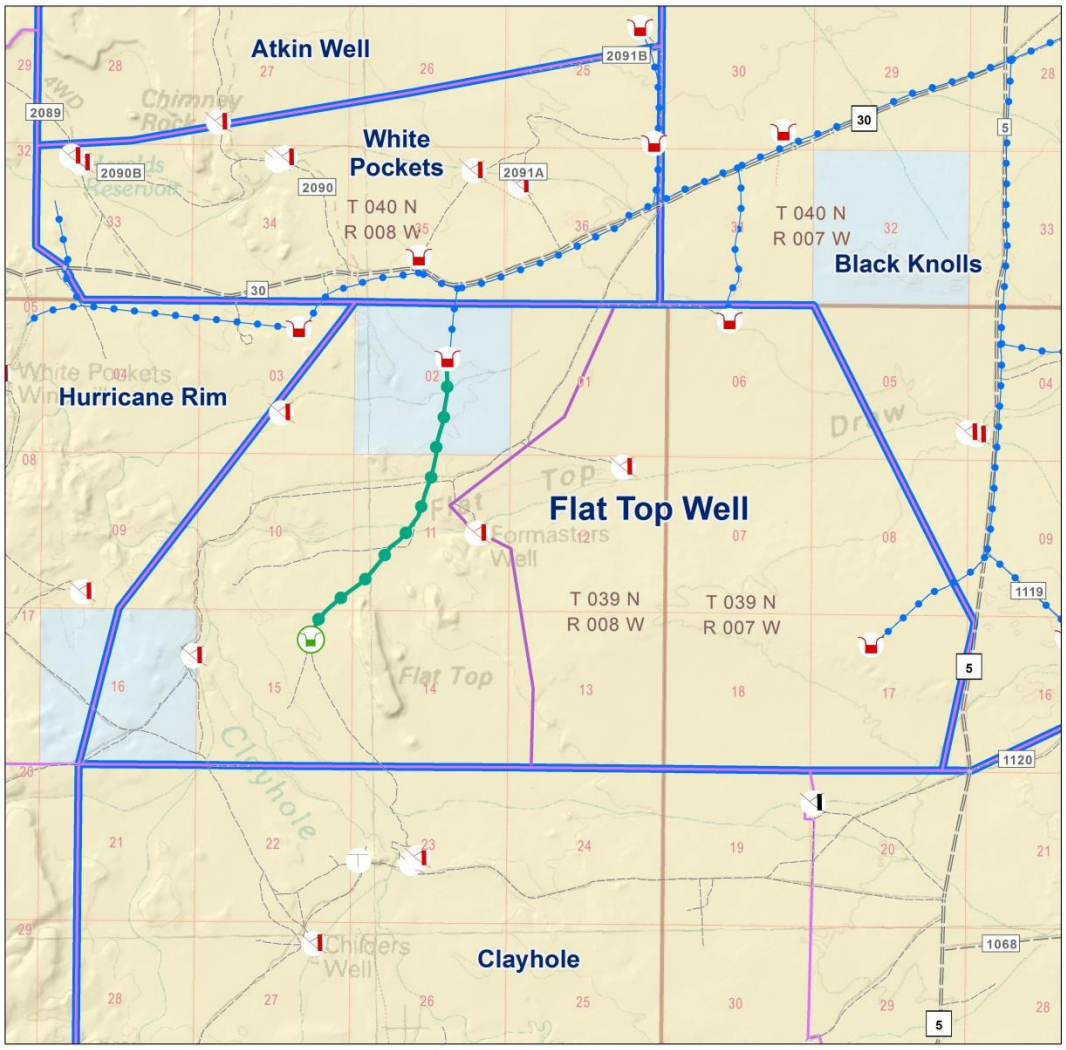
Flat Top Well Allotment - Proposed Developments
NEPA No. DOI-BLM-AZ-A010-2016-0027-EA
Bureau of Land Management - Arizona Strip Field Office



Proposed Development
- Trough
- Proposed Pipeline

Existing Development
- Livestock Trough
- Unfenced Reservoir
- Detention Dam
- Fenced Reservoir

Grazing Boundaries
- Allotment
- Pasture

0 0.5 1 Miles
0 0.5 1 Kilometers

Public Land Survey System
- PLSS Township
- PLSS Section

Surface Management
- Bureau of Land Management
- State

Transportation Routes
- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track
- Reclaiming

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Data Sources
All layers: BLM and ASDO Geodatabases

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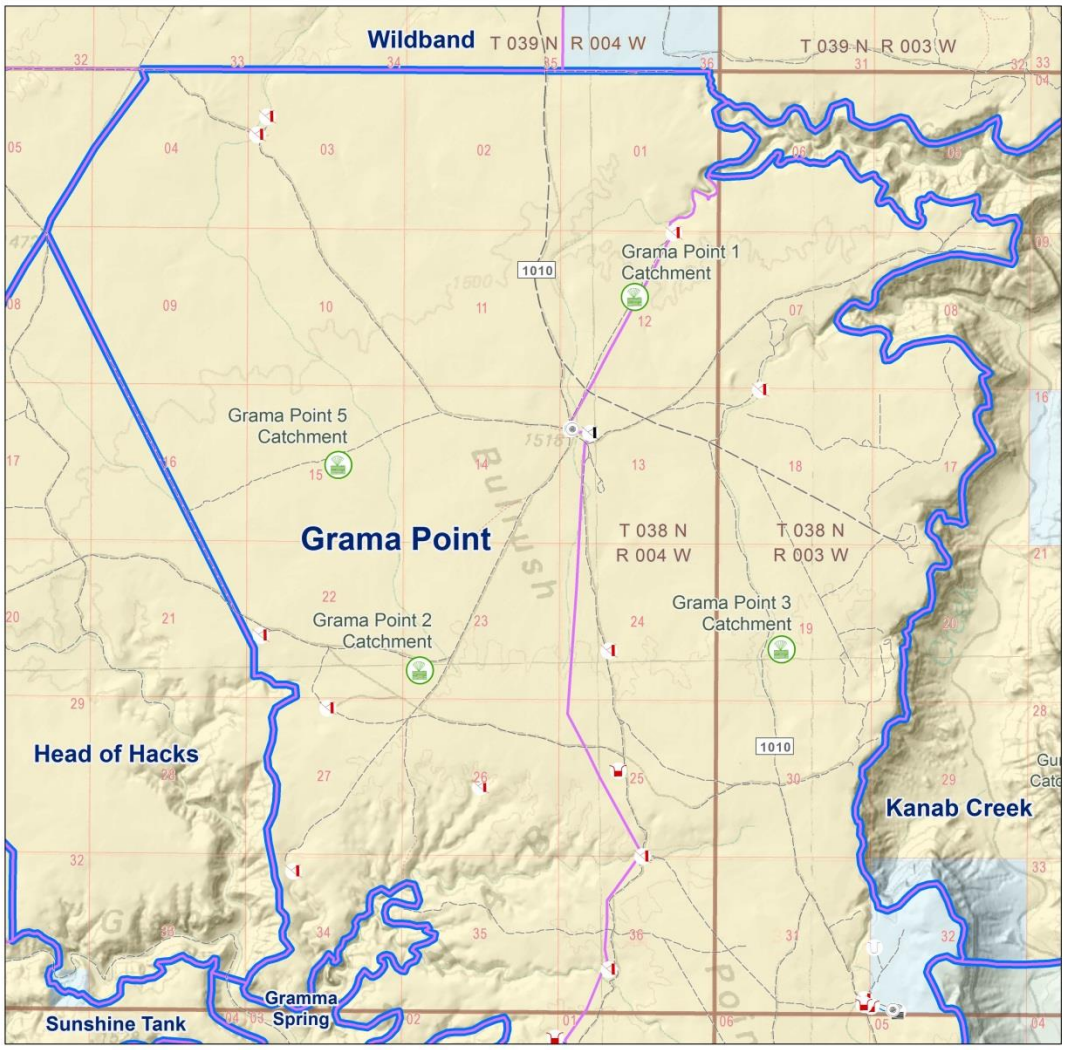
BLM

Arizona Strip District

Grama Point Allotment (North) - Proposed Developments
NEPA No. DOI-BLM-AZ-A010-2016-0027-EA
Bureau of Land Management - Arizona Strip Field Office



Proposed Developments
- Catchment

Existing Developments
- Pipeline
- Water Storage Tank
- Well
- Wildlife Drinker
- Fenced Reservoir
- Livestock Catchment
- Livestock Trough
- Unfenced Reservoir

Grazing Boundaries
- Allotment
- Pasture

0 0.5 1 Miles
0 0.5 1 Kilometers

Public Land Survey System
- PLSS Township
- PLSS Section

Surface Management
- Bureau of Land Management
- State
- Private
- US Forest Service

Transportation Routes
- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track
- Reclaiming

Map Produced by: BLM - Arizona Strip District GIS Program
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Data Sources
All layers: BLM and ASDO Geodatabases

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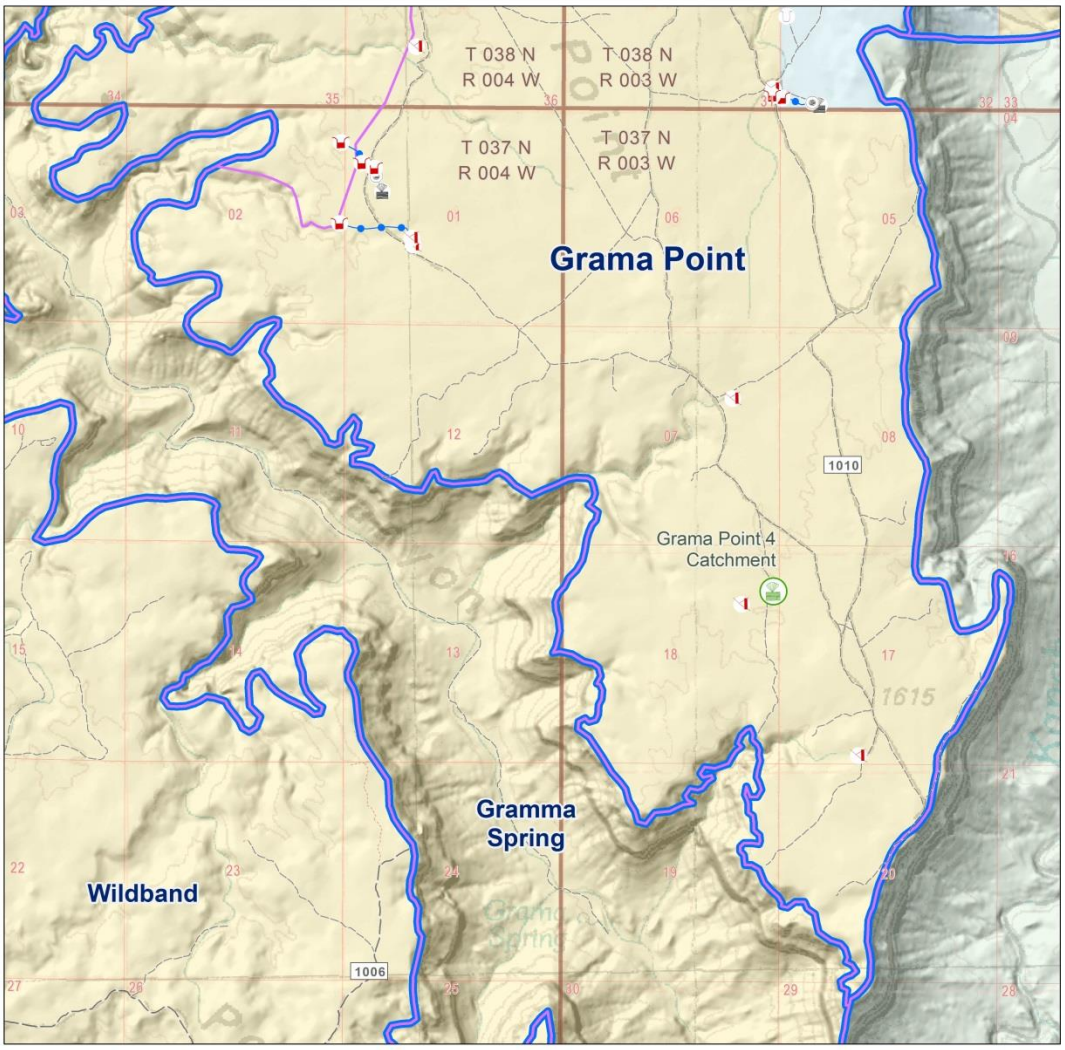
BLM

Arizona Strip District

Grama Point Allotment (South) - Proposed Developments
NEPA No. DOI-BLM-AZ-A010-2016-0027-EA
Bureau of Land Management - Arizona Strip Field Office



Proposed Developments
- Catchment

Existing Developments
- Pipeline
- Water Storage Tank
- Well
- Wildlife Drinker
- Fenced Reservoir
- Livestock Catchment
- Livestock Trough
- Unfenced Reservoir

Grazing Boundaries
- Allotment
- Pasture

Public Land Survey System
- PLSS Township
- PLSS Section

Surface Management
- Bureau of Land Management
- State
- Private
- US Forest Service

Transportation Routes
- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track
- Reclaiming

Map Produced by: BLM - Arizona Strip District GIS Program
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Data Sources
All layers: BLM and ASDO Geodatabases

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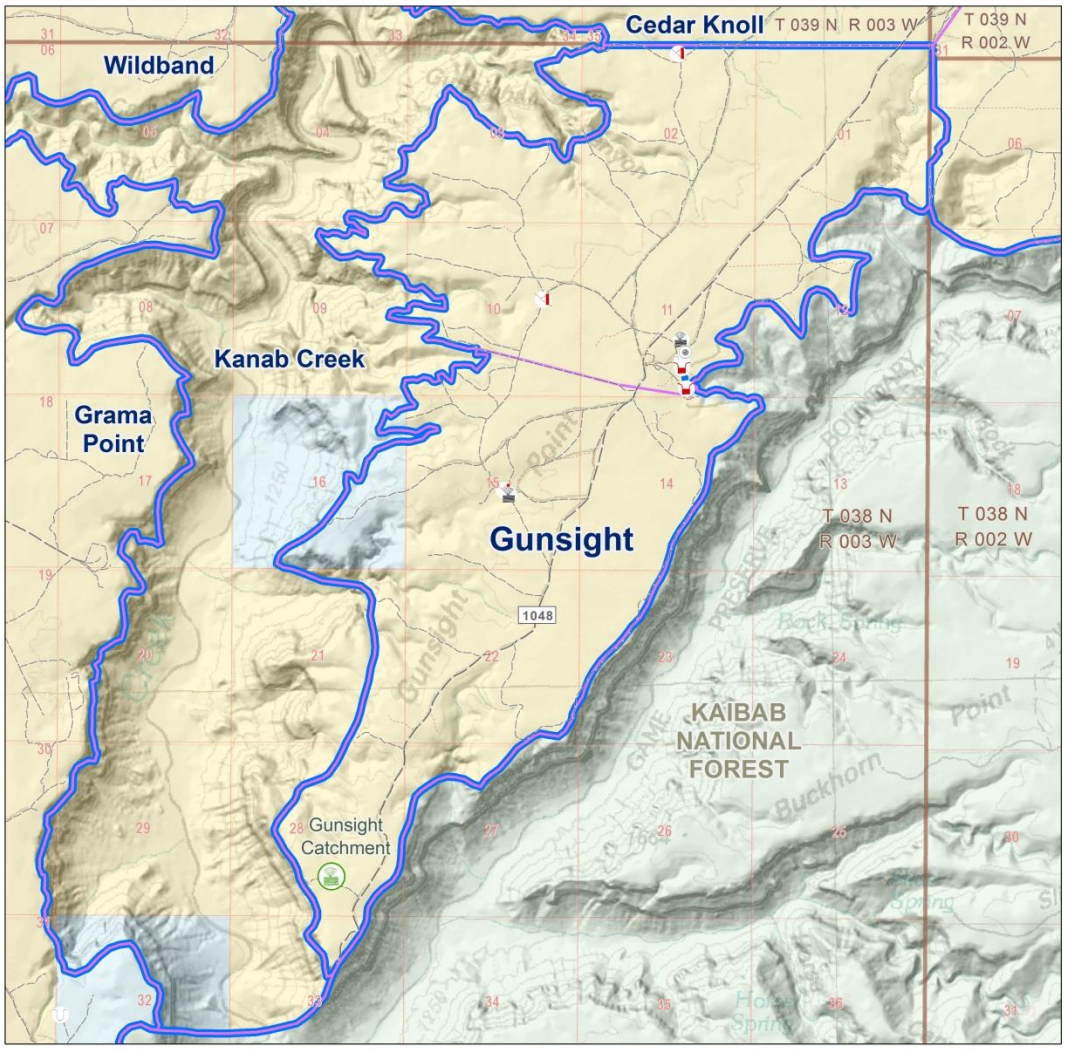
BLM

Arizona Strip District

Gunsight Allotment - Proposed Developments
NEPA No. DOI-BLM-AZ-A010-2016-0027-EA
Bureau of Land Management - Arizona Strip Field Office



Proposed Developments
- Catchment

Existing Developments
- Pipeline
- Water Storage Tank
- Well
- Wildlife Drinker
- Fenced Reservoir
- Livestock Catchment
- Livestock Trough
- Unfenced Reservoir

Grazing Boundaries
- Allotment
- Pasture

0 0.5 1 Miles
0 0.5 1 Kilometers

Public Land Survey System
- PLSS Township
- PLSS Section

Surface Management
- Bureau of Land Management
- State
- Private
- US Forest Service

Transportation Routes
- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track
- Reclaiming

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Data Sources
All layers: BLM and ASDO Geodatabases

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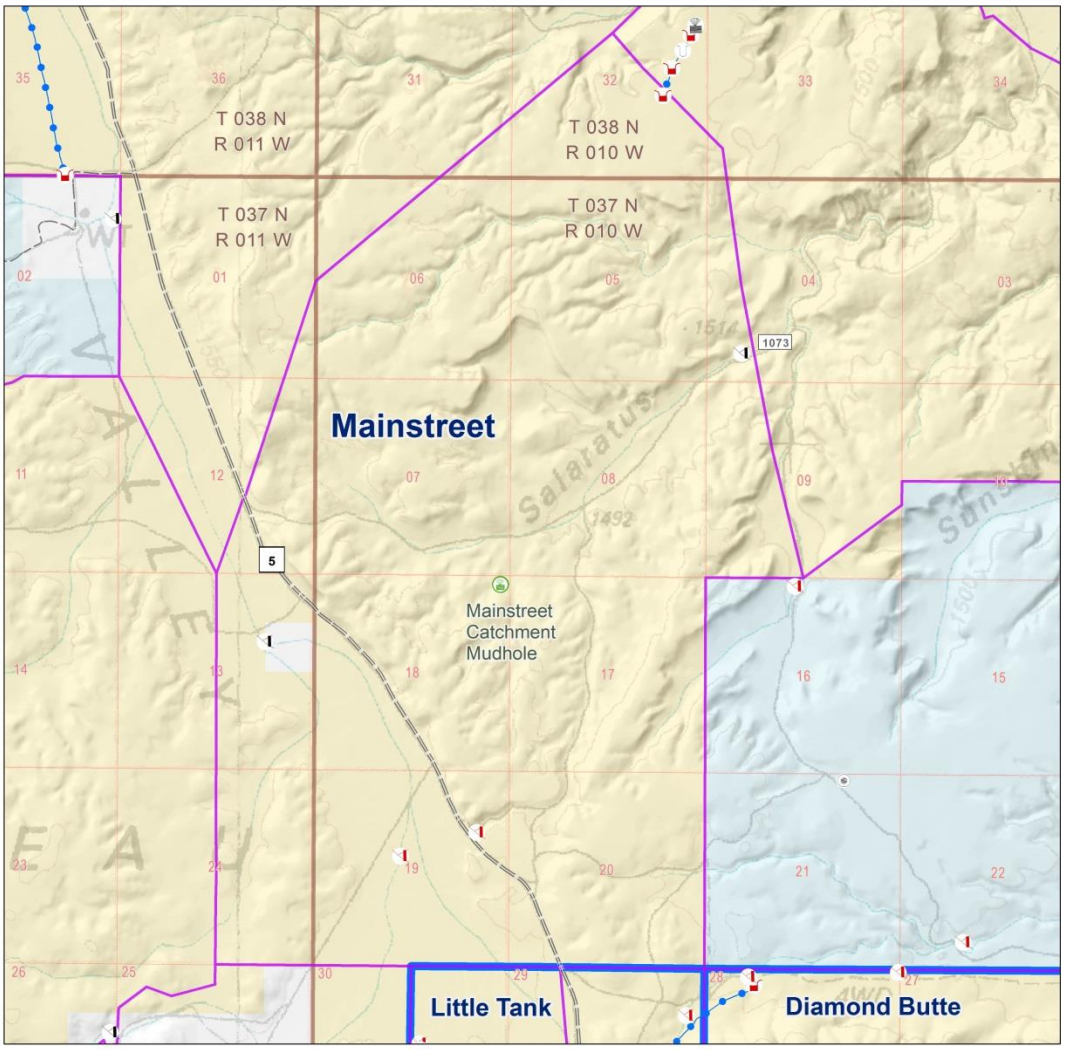
BLM

Arizona Strip District

Mainstreet Allotment (Central) - Proposed Developments
NEPA No. DOI-BLM-AZ-A010-2016-0027-EA
Bureau of Land Management - Arizona Strip Field Office



Proposed Developments
- Catchment

Existing Developments
- Detention Dam
- Developed Spring
- Fenced Reservoir
- Livestock Catchment
- Livestock Trough
- Unfenced Reservoir
- Pipeline
- Water Storage Tank
- Well
- Wildlife Drinker

Grazing Boundaries
- Allotment
- Pasture

0 0.25 0.5 Miles
0 0.25 0.5 Kilometers

Public Land Survey System
- PLSS Township
- PLSS Section

Surface Management
- Bureau of Land Management
- State
- Private

Transportation Routes
- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track
- Reclaiming

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Data Sources
All layers: BLM and ASDO Geodatabases

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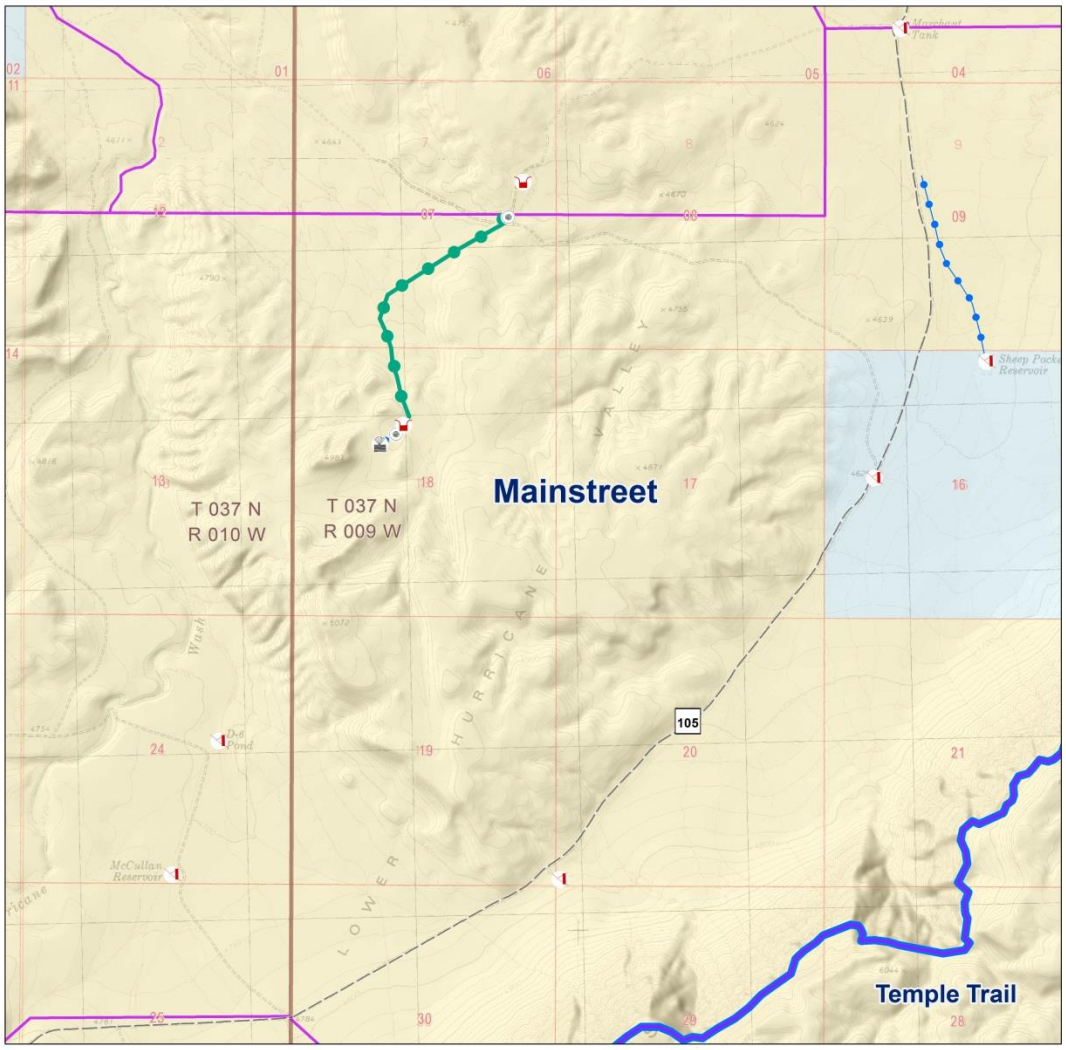
BLM

Arizona Strip District

Mainstreet Allotment (East) - Proposed Developments
NEPA No. DOI-BLM-AZ-A010-2016-0027-EA
Bureau of Land Management - Arizona Strip Field Office



Proposed Developments
- Pipeline

Existing Developments
- Detention Dam
- Developed Spring
- Fenced Reservoir
- Livestock Catchment
- Livestock Trough
- Unfenced Reservoir
- Pipeline
- Water Storage Tank
- Well
- Wildlife Drinker

Grazing Boundaries
- Allotment
- Pasture

0 0.25 0.5 Miles
0 0.25 0.5 Kilometers

Public Land Survey System
- PLSS Township
- PLSS Section

Surface Management
- Bureau of Land Management
- State
- Private

Transportation Routes
- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track
- Reclaiming

Map Produced by: BLM - Arizona Strip District GIS Program
User: bhansen
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Data Sources
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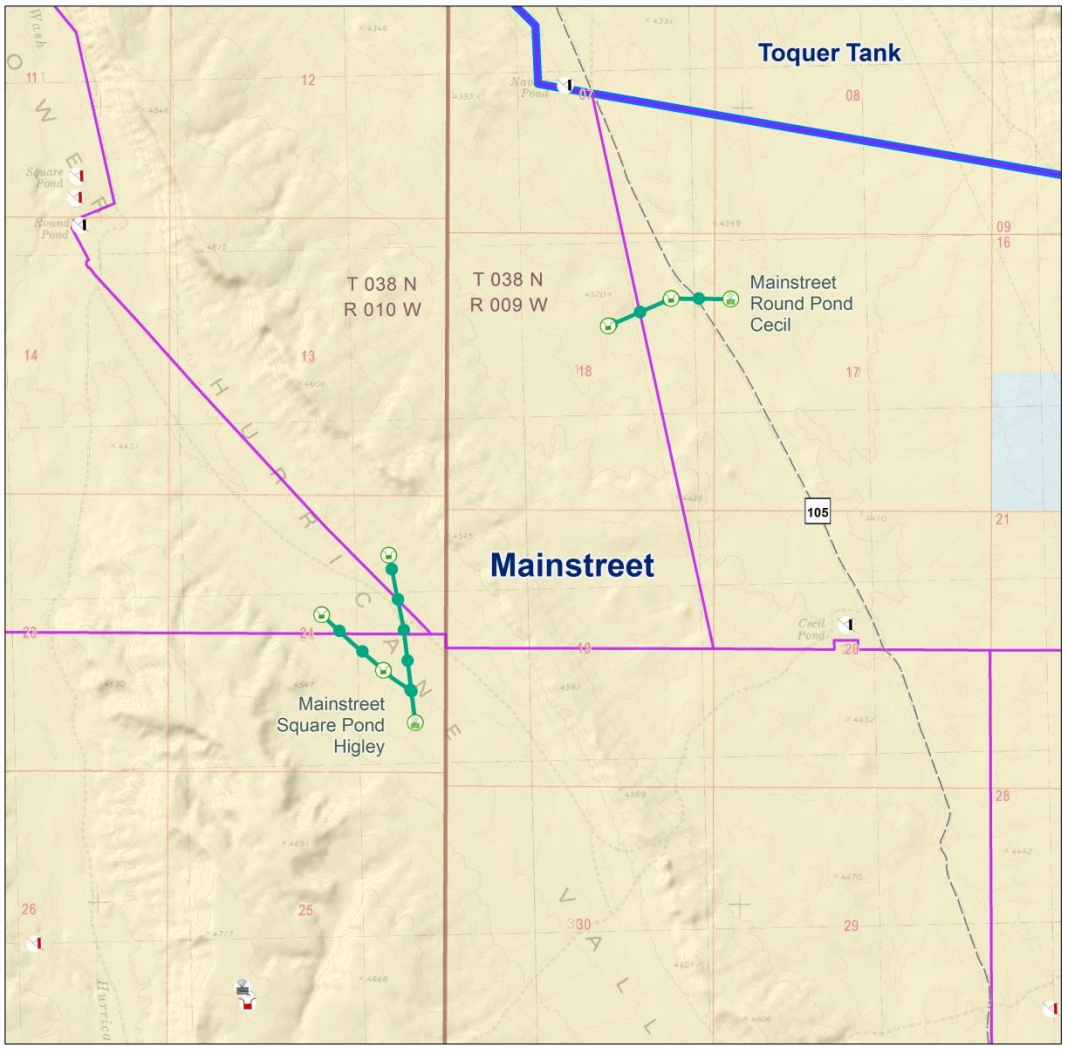
BLM

Arizona Strip District

Mainstreet Allotment (Northeast) - Proposed Developments
NEPA No. DOI-BLM-AZ-A010-2016-0027-EA
Bureau of Land Management - Arizona Strip Field Office



Proposed Developments
- Catchment
- Trough
- Pipeline

Existing Developments
- Detention Dam
- Developed Spring
- Fenced Reservoir
- Livestock Catchment
- Livestock Trough
- Unfenced Reservoir
- Pipeline
- Water Storage Tank
- Well
- Wildlife Drinker

Grazing Boundaries
- Allotment
- Pasture

0 0.25 0.5 Miles
0 0.25 0.5 Kilometers

Public Land Survey System
- PLSS Township
- PLSS Section

Surface Management
- Bureau of Land Management
- State
- Private

Transportation Routes
- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track
- Reclaiming

Map Produced by: BLM - Arizona Strip District GIS Program
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Data Sources
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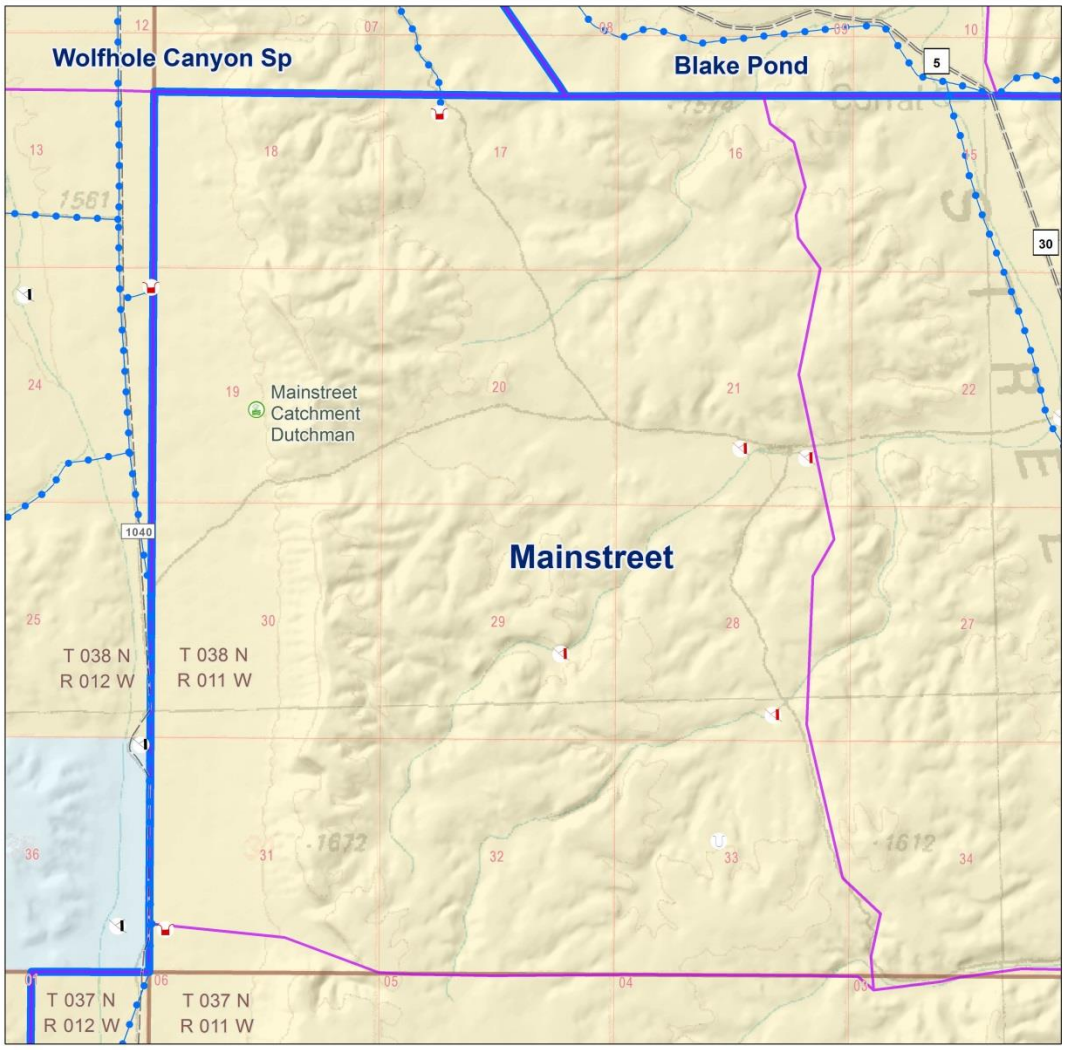
BLM

Arizona Strip District

Mainstreet Allotment (Northwest) - Proposed Developments
NEPA No. DOI-BLM-AZ-A010-2016-0027-EA
Bureau of Land Management - Arizona Strip Field Office



Proposed Developments
- Catchment

Existing Developments
- Detention Dam
- Developed Spring
- Fenced Reservoir
- Livestock Catchment
- Livestock Trough
- Unfenced Reservoir
- Pipeline
- Water Storage Tank
- Well
- Wildlife Drinker

Grazing Boundaries
- Allotment
- Pasture

0 0.25 0.5 Miles
0 0.25 0.5 Kilometers

Public Land Survey System
- PLSS Township
- PLSS Section

Surface Management
- Bureau of Land Management
- State
- Private

Transportation Routes
- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track
- Reclaiming

Map Produced by: BLM - Arizona Strip District GIS Program
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Data Sources
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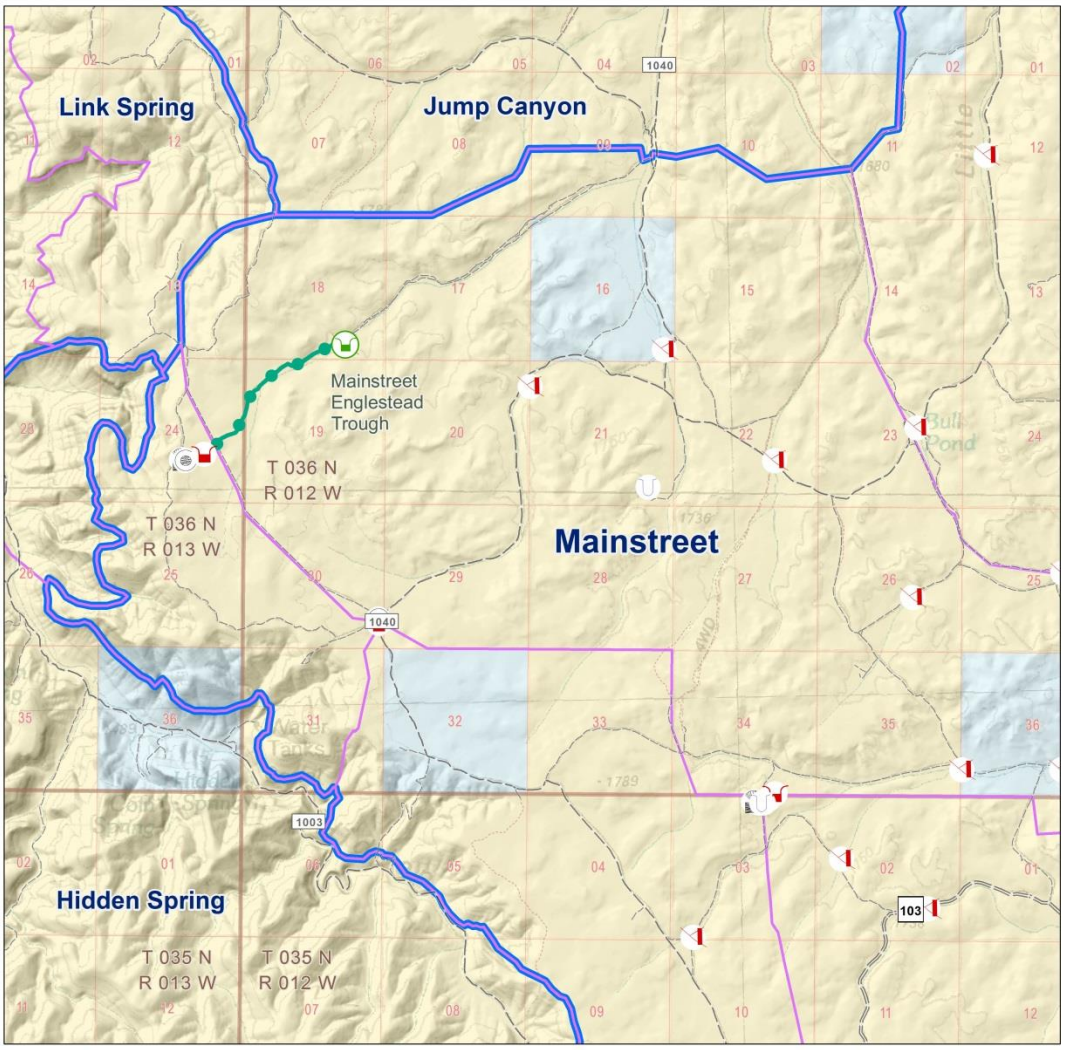
BLM

Arizona Strip District

Mainstreet Allotment (Southwest) - Proposed Developments
NEPA No. DOI-BLM-AZ-A010-2016-0027-EA
Bureau of Land Management - Arizona Strip Field Office



Proposed Developments
- Trough
- Pipeline

Existing Developments
- Livestock Catchment
- Livestock Trough
- Unfenced Reservoir
- Water Storage Tank
- Wildlife Drinker

Grazing Boundaries
- Allotment
- Pasture

0 0.5 1 Miles
0 0.5 1 Kilometers

Public Land Survey System
- PLSS Township
- PLSS Section

Surface Management
- Bureau of Land Management
- State

Transportation Routes
- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track
- Reclaiming

Map Produced by: BLM - Arizona Strip District GIS Program
User: bhansen
Document: ASFO_water_dev_EA_Mainstreet_SW.mxd
Date: 2/9/2017

Coordinate System: NAD 1983
ReferenceSystem: U.S. PLSS GSRB&M
Ratio Scale: 1:65,000 at 8.5x11 page output

Data Sources
All layers: BLM and ASDO Geodatabases

N

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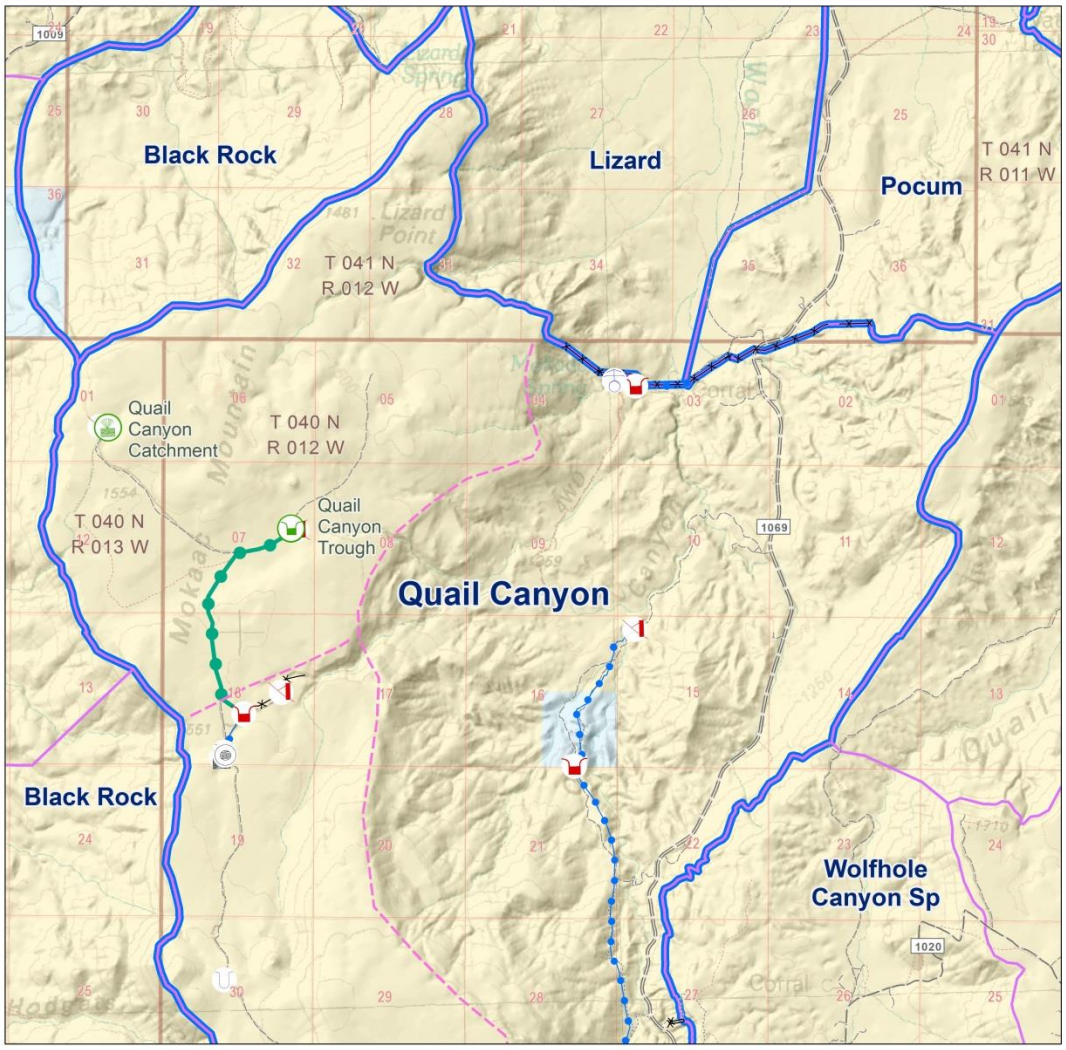
BLM

Arizona Strip District

Quail Canyon Allotment (North) - Proposed Developments
NEPA No. DOI-BLM-AZ-A010-2016-0027-EA
Bureau of Land Management - Arizona Strip Field Office

BLM



Proposed Developments
- Catchment
- Trough
- Pipeline

Existing Developments
- Unfenced Reservoir
- Water Storage Tank
- Wildlife Drinker
- Developed Spring
- Fenced Reservoir
- Livestock Trough

Grazing Boundaries
- Allotment
- Pasture

0 0.5 1 Miles
0 0.5 1 Kilometers

Public Land Survey System
- PLSS Township
- PLSS Section

Surface Management
- Bureau of Land Management
- State
- Private

Transportation Routes
- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track
- Reclaiming

Map Produced by: BLM - Arizona Strip District GIS Program
User: bhansen
Document: ASFO_water_dev_EA_Quail_Canyon_N.mxd
Date: 2/9/2017

Coordinate System: NAD 1983
ReferenceSystem: U.S. PLSS GSRB&M
Ratio Scale: 1:62,000 at 8.5x11 page output

Data Sources
All layers: BLM and ASDO Geodatabases

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Arizona Strip District

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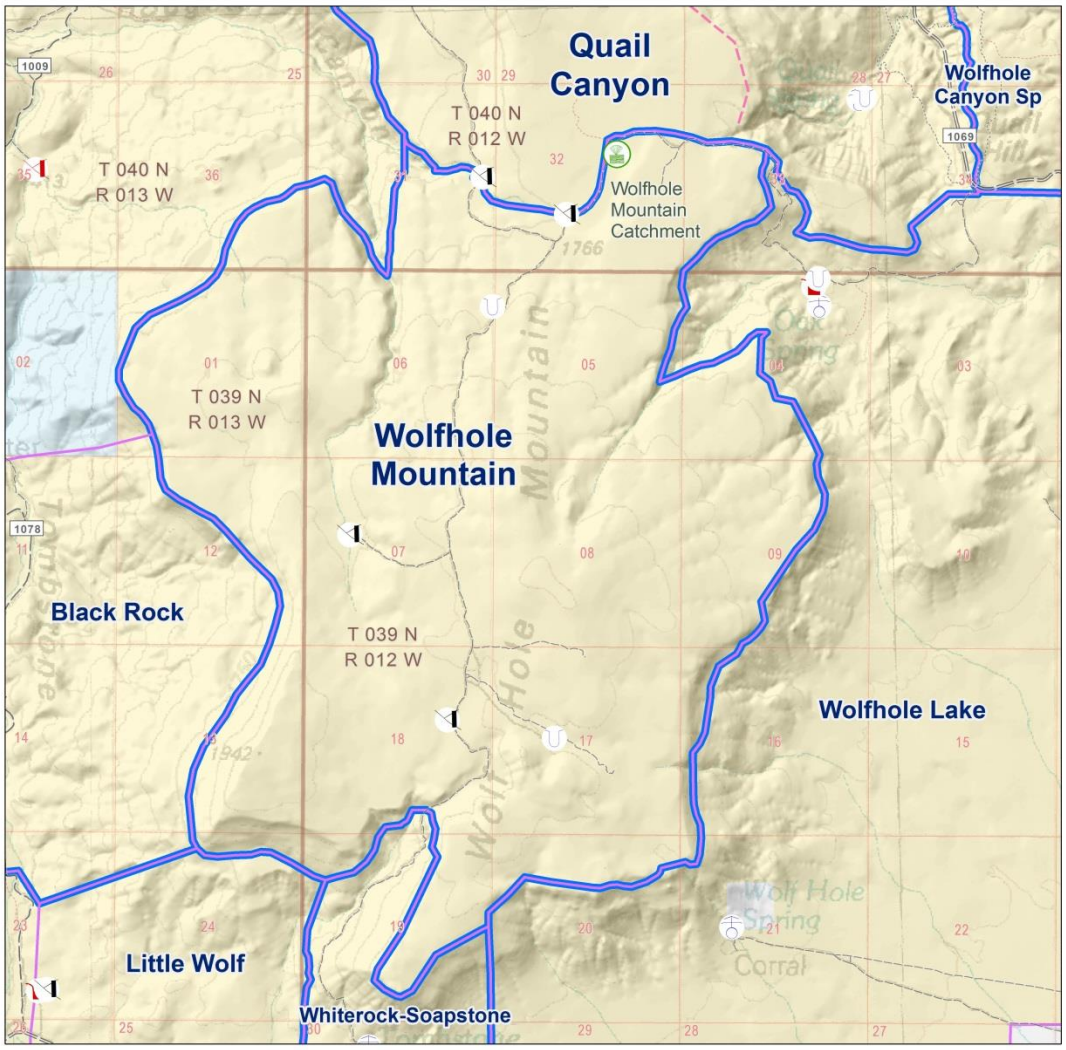
Quail Canyon (South) and Wolfhole Mountain Allotments - Proposed Developments
NEPA No. DOI-BLM-AZ-A010-2016-0027-EA

Bureau of Land Management - Arizona Strip Field Office



Proposed Developments
- Catchment

Existing Developments
- Unfenced Reservoir
- Water Storage Tank
- Wildlife Drinker
- Developed Spring
- Fenced Reservoir
- Livestock Trough

Grazing Boundaries
- Allotment
- Pasture

0 0.5 1 Miles
0 0.5 1 Kilometers

Public Land Survey System
- PLSS Township
- PLSS Section

Surface Management
- Bureau of Land Management
- State
- Private

Transportation Routes
- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track
- Reclaiming

Map Produced by: BLM - Arizona Strip District GIS Program
User: bhansen
Document: ASFO_water_dev_EA_Quail_S_Wolfh.mxd
Date: 2/9/2017

Coordinate System: NAD 1983
ReferenceSystem: U.S. PLSS GSRB&M
Ratio Scale: 1:50,000 at 8.5x11 page output

Data Sources
All layers: BLM and ASDO Geodatabases

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Arizona Strip District