United States Department of the Interior
Bureau of Land Management

Environmental Assessment
DOI-BLM-AZ-A010-2021-0008-EA

Clayhole Allotment
Water Developments

Mohave County, Arizona

June 2022

Arizona Strip Field Office
345 E. Riverside Drive
St. George, Utah 84790
Phone: (435) 688-3200
FAX: (435) 688-3258

BLM

Clayhole Allotment
Pipeline Installation & Water Development
DOI-BLM-AZ-A010-2021-0008-EA

Table of Contents

List of Tables

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
DFC	Desired Future Condition
DPC	Desired Plant Community
DWR	Dry Weight Rank
EA	Environmental Assessment
GIS	Geographic Information System
NEPA	National Environmental Policy Act
NOFD	Notice of Final Decision
NOPD	Notice of Proposed Decision
NRCS	Natural Resources Conservation Service
p.z.	Precipitation Zone
RMP	Resource Management Plan
S&G	Standards and Guidelines
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VRM	Visual Resource Management

CHAPTER 1

1.0 PURPOSE AND NEED

1.1 Introduction and Background

This environmental assessment (EA) has been prepared to analyze the potential effects of the proposed action to install approximately 92 miles of pipeline, four water storage tanks, 60 livestock watering troughs, and approximately 2.5 miles of fencing within the Clayhole allotment. An allotment management plan (AMP) is in effect for this allotment which identifies the need for additional facilities for improved grazing management. The Bureau of Land Management (BLM), Arizona Strip Field Office, the Heaton Cattle Company (the grazing permittee who holds the grazing permit), and the Natural Resources Conservation Service (NRCS) are working cooperatively to improve grazing management, watershed conditions, and rangeland health within the Clayhole Allotment.

1.2 Purpose and Need

The purpose of this federal action is to respond to an external request to install and use a water pipeline, water storage tanks and livestock water troughs in the Clayhole Allotment. The need for this Federal action is established in 43 CFR 4120.3-1(f) which states that proposed range improvement projects shall be reviewed in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4371, et seq), and management objectives established by the Arizona Strip Field Office Resource Management Plan (RMP).

The Clayhole Allotment consists of 115,552 acres and has 13 pastures (Appendix A, Figure 1). There are 9,371 active animal unit months (AUM) authorized; cattle are grazed year-round (December 1 through November 30) and are rotated through the pastures on a best pasture rotation as specified in the AMP.

Water distribution within the 13 pastures is limited because most of the existing reservoirs are unreliable, dependent on rainfall events to refill, lack in water storage capabilities, and leak due to the inability of soils to retain water. Currently, there are six large reservoirs within the allotment that historically hold water. Other reliable water sources include Yellowstone Spring, Clayhole Well, and Black Point Well. The current locations of the reliable water sources listed above do not provide adequate water distribution throughout the allotment. Therefore, the NRCS along with Heaton Cattle Co., grazing permittee, have proposed to construct approximately 92 miles of pipeline to connect the above-mentioned reservoirs, wells, and Yellowstone Spring, to locations within all thirteen pastures of the Clayhole Allotment. The proposed action is designed to use these reliable water sources to provide water throughout the allotment for both livestock and wildlife. Water from these sources would be piped into storage tanks from which water would gravity flow to troughs throughout the allotment. The current

water distribution makes it difficult for the permittee and the BLM to best plan and adhere to the grazing system contained within the AMP. The proposed action would result in a more uniform utilization of forage, which would aid in maintaining and improving the desired plant community (DPC) objectives. The uniformity in livestock distribution would enhance rangeland vegetation by accelerating plant succession while increasing plant diversity and vigor.

The land health evaluation for this allotment was completed in 2008 and it was determined that the allotment is making significant progress toward meeting the standards for rangeland health. The evaluation identified DPC objectives for the allotment and determined that these objectives are partially met.

The intention of the proposed project is not to increase permitted use (AUMs), but to encourage and achieve better livestock distribution within the allotment.

The proposed project would also provide additional water sources for wildlife (including mule deer and pronghorn). The *Arizona Strip Interdisciplinary Mule Deer Management Plan 2015-2019* (AGFD and BLM 2015), which was developed jointly by the BLM and Arizona Game and Fish Department (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 several 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).

Based on the information provided in this environmental assessment (EA), the deciding officer, which is the Arizona Strip Field Manager, will decide whether to authorize the installation of the water pipeline, water storage tanks and livestock watering troughs, and fencing, or whether to deny the proposed water development project.

1.3 Conformance with Land Use Plan

The proposed action described in Chapter 2 of this EA 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:

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-05
Fences will be the minimum necessary for effective livestock control or other administrative purposes. Fences will be wildlife passable, consistent with the species found in the area.

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 habitat will be safely accessible to pronghorn and other wildlife.

DFC-WF-25
Water sources within pronghorn habitat will be spaced no more than 3 miles apart.

MA-WF-09
Existing water developments will be modified to ensure wildlife have safe access to water. Existing water developments will be maintained to ensure reliability of the water. Maintenance of existing waters will generally take priority over new construction. Development of cooperative waters for livestock and wildlife will be encouraged where doing so benefits wildlife, is consistent with achieving DFCs, and is economically efficient.

MA-WF-10
Escape ramps will continue to be maintained and, where needed, installed at all waters accessible to wildlife to minimize drowning.

The following decision is from Table 2.11 in the RMP regarding Livestock Grazing:

DFC-GM-02
Livestock use and associated management practices will be conducted in a manner consistent with other resource needs and objectives to ensure that the health of rangeland resources is preserved or improved so that they are productive for all rangeland values. Where needed public rangeland ecology will be improved to meet objectives.

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 BLM 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 Statewide Pronghorn Management Plan* (AGFD 2009), which states (on page 48 of the plan) that "Water is a limited resource in [Game Management Unit 13A] with few year-round waters available for pronghorn use." The plan includes management objectives for Unit 13A, including increasing/maintaining yearlong water availability and distribution throughout pronghorn habitat".

The proposed action is also consistent with the *Arizona Strip Interdisciplinary Mule Deer Management Plan* (AGFD and BLM 2010), which states (on pages 9-10 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 area is in Mohave County, Arizona. The proposed action is consistent with the *Mohave County General Plan,* adopted September 1994 and revised December 5, 2005. While the actions proposed in this EA are not specifically addressed in the County's Plan, 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). The proposed action does not conflict with decisions contained within this plan.

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.

- **Livestock Grazing:** The proposed pipeline, water storage tanks and livestock water troughs would provide reliable sources of water being available at appropriate times for the grazing of livestock. This would help to increase the distribution of livestock by having the waters distributed throughout each pasture, while enabling use of different portions of the pastures at different times, thus enhancing grazing system identified in the existing AMP.

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

- **Wildlife:** Disturbance to wildlife, including migratory birds and sensitive species, could occur during construction caused by the potential short-term loss of vegetation for food and cover, and short-term noise and soil compaction from construction. Long-term effects to wildlife could result from having to navigate an additional fence and having new reliable sources of water. Wildlife could also be affected in the long-term by providing additional (and more reliable) water sources.

CHAPTER 2

2.0 DESCRIPTION OF ALTERNATIVES

2.1 Introduction

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. Two additional alternatives were considered but eliminated from further analysis; these are described in Section 2.4 along with rationale for not being further considered.

2.2 Alternative A – Proposed Action

The proposed action would be to install approximately 92 miles of pipeline to deliver water from water sources that are currently developed (the six existing reservoirs that reliably contain water, Clayhole and Black Point wells, and the Yellowstone Spring) to locations within all pastures of the Clayhole Allotment (see Appendix A, Figure 2). The proposed pipeline would consist of 1½-inch or 2-inch-high density polyethylene pipe buried 18 to 24 inches deep using a ripper tooth attached to a track vehicle. The pipeline would be installed by driving a crawler tractor with the ripper tooth attached and lowered into the ground across the route of the 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. A track-hoe or backhoe would be used to install the pipe where topography or soil composition requires. The pipeline would be installed along existing roads where possible (approximately 76 miles); approximately 16 miles of pipeline would be cross country (i.e., new disturbance).

Water troughs would be placed along the pipeline route and would be constructed using heavy equipment sized tires and secured to the proposed locations using concrete. Water troughs would be no more than 50 feet from the pipeline. The proposed action includes placing 60 watering troughs, 22 of which would be near existing earthen reservoirs that are currently non-functioning or unreliable (but in areas of existing disturbance) and 38 that would be constructed in new locations (Appendix A, Figures 3-11). Wildlife ramps would be installed in each trough prior to filling with water. When cattle are removed from a pasture, troughs would be left full of water and available to wildlife.

Four, 100,000 to 200,000-gallon water storage tanks would be constructed, three on BLM land at South Larimore (Appendix A, Figure 3), Hat Knoll, and Black Point (Appendix A, Figure 4). The proposed tank at Black Point would replace a 10,000-gallon tank that is currently in place. The fourth tank would be constructed on private land at McBryde (Appendix A, Figure 5). One 10,000 to 20,000-gallon tank would be constructed on State land at Trail Pond (Appendix A, Figure 5).

The proposed action also includes the option to place a 5,000-gallon to 10,000-gallon storage tank next to water troughs that require higher water volume output to meet the initial and high use demand of livestock watering at these locations. While this may not occur at each site, any

or all troughs listed in Table 2.1 could have a 10,000-gallon tank placed near the trough to support higher demand.

Table 2.1. Clayhole Allotment - Potential Placements of 5,000-10,000 Gallon Water Tanks

Pasture	Trough Name	Figure from Appendix A
Larimore	Hat Knoll Trough	4
Larimore	Hat Knoll Tank Trough 2	4
Larimore	Seven Knolls Trough 2	8
Larimore	Seven Knolls Trough 3	8
Larimore	East Fork Black Canyon Trough	8
Larimore	Airplane Trough	8
Larimore	Langston's Trough 1	8
Larimore	Larimore Spur Trough	8
Larimore	Larimore East Trough 1	8
Larimore	Larimore East Trough 2	8
Larimore	Larimore East Trough 3	8
Larimore	Larimore East Trough 4	8
Larimore	The Lake Trough	8
South	Larimore East Trough 5	3
South	Larimore East Trough 6	3
South	Larimore East Trough 7	3
South	South Larimore Trough 1	3
South	South Larimore Trough 2	3
South	South Larimore Trough 3	3
South	West Larimore Trough	3
South	Larimore Tank Trough	3
Larimore	Cutler Pockets Trough	3
Little Clayhole	Trail Pond Trough 2	6
Little Clayhole	Trail Pond Trough 3	6

A mobile pump unit would be used to pump water from the reservoirs to the proposed water storage tanks; this pump would be moved to whichever pond was being used at the time. Pumps would be installed on the Black Point Tank and the Hat Knoll Tank to pump water to the Larimore catchment (existing) and the proposed South Larimore Tank (Appendix A, Figure 4). Water would be pumped from a tank at Trail Pond to the tank at Seven Knolls Catchment (existing) to supply water to the proposed pipeline extending south from the catchment (Appendix A, Figure 6).

The proposed action includes construction of approximately two miles of fence beginning at the Cabin Valley Pond and running east for one mile then turning south to connect to Hat Knoll.

Installing this fence would add a small holding pasture that could be used when working cattle at the Cabin Valley Corral (Appendix A, Figure 4).

Fences would also be constructed around the following reservoirs: Bundy Pond, Nyborg, (Appendix A, Figure 4) and Cement Dam (Appendix A, Figure 5). All fences would be type "A" fence, which is a 42-inch high, four wire strand, wildlife passable fence. Wire heights from the ground up would be 16-22-30-42 inches. As recommended by AGFD and BLM wildlife specifications, the bottom strand would consist of twisted barbless wire to facilitate pronghorn passage. The other three strands would be barbed wire. The fences would have 16½ -foot spacing between steel posts with two metal stays between posts. Wooden braces would be installed at each end of the fence, at fence corners, and at quarter mile intervals along the fence line. 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. Constructing fences around the reservoirs listed above would allow the grazing permittee to control grazing intensity within the pasture in which the reservoirs are located. Cattle could be restricted from accessing the reservoir and moved to other troughs located within the pasture near underutilized areas, although the reservoirs would still be accessible to wildlife.

The proposed fencing around the reservoirs would be designed to meet AGFD and BLM wildlife specifications (i.e., the bottom strand would consist of twisted barbless wire) to facilitate safe passage of mule deer, pronghorn, and other wildlife species. These wildlife-friendly fences would allow passage underneath, through, and over each fence to ensure access to the reservoirs by wildlife while not impacting the natural movement of wildlife.

The proposed fencing and water facilities (pipeline, troughs, and storage tanks) would improve the management of livestock as specified in the AMP and benefit rangeland health by providing reliable year-round water sources. This, in turn, would disperse livestock throughout each pasture instead of congregating livestock around the unfenced reservoirs, which are often the only available water sources during the summer months. Cattle would be better able to access areas within the allotment which have been underutilized due to distance from water and reduce the utilization of forage near current reliable water sources, resulting in a more uniform utilization of forage while not exceeding the maximum utilization level of 50%.

The proposed action would include future maintenance activities for the life of the 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 and replacing or patching material when repairs are needed, and annual inspections of the pipeline and troughs, which includes digging to find and repair leaks or clogs in the pipe. The exact location of livestock watering troughs or route of the pipeline may deviate slightly from that shown as the terrain or the cultural resources survey requires.

Materials for construction of the proposed projects would primarily be provided by the NRCS. Additional funding may be provided by the permittee, Arizona Strip Grazing Board, AGFD, and the BLM. Labor is typically provided by the grazing permittee as part of the cost sharing agreement.

As stated previously, the Clayhole Allotment consists of 115,552 acres; the area of potential ground/vegetation disturbance associated with the proposed action totals 112 acres (new disturbance plus the disturbance in existing disturbed areas, i.e., roads, reservoirs, etc. – see Table 2.2 below), which is 0.001 percent of the acres within the allotment. The pipeline and fence areas would result in permanent loss of vegetation on approximately 7.5 acres.

Table 2.2. Proposed Action – Acres of Potential Ground & Vegetation Disturbance

Improvement Type	Proposed Number	Proposed miles	New Disturbance Acres	Disturbance in Existing Disturbed Areas, i.e., Roads, Reservoirs, etc.	Total Disturbance
Pipeline	N/A	92	17.5	82.9	100.4
Troughs	60	N/A	2.0	1.4	3.4
100,000-200,000 Gallon Storage Tanks	3[1]	N/A	1	1	2.0
10,000 Gallon Storage Tanks	24	N/A	1	0.4	1.4
Fencing	N/A	2.5	4	0.8	4.8
Total	**87**	**94.5**	**25.5[2]**	**86.5[3]**	**112**

2.2.1 Best Management Practices

The proposed action would be subject to the following best management practices (BMPs) to minimize the impacts of the project to environmental resources.

Wildlife

- Construction would be limited to daylight hours to minimize impacts to wildlife.
- Construction and maintenance activities should avoid pronghorn fawning (May 1 – June 30) to the extent possible.
- Construction and maintenance activities should avoid the critical nesting period for migratory birds (April 15 – July 31). If construction is to be done during the critical nesting period, nesting surveys would be conducted by a qualified biologist. If an active nest is located within the project area during project construction, the Arizona Strip Field Office Manager (or his/her designee) would be immediately notified to develop appropriate measures to avoid disturbance to the nesting birds.
- Open trenches have the potential to trap and injure wildlife. During construction of the pipeline, these risks would be mitigated by minimizing the length of time trenches are left

[1] One additional 100,000-200,000-gallon storage tank would be constructed on private land within the allotment.
[2] This figure represents temporary (construction) disturbance. The pipeline and fence areas would revegetate over time, resulting in permanent loss of vegetation on approximately 5.5 acres.
[3] This figure represents temporary (construction) disturbance. The pipeline and fence areas would revegetate over time, resulting in permanent loss of vegetation on approximately 2 acres.

open, providing escape avenues (lateral trenches) for wildlife when left overnight, and inspecting the trenches prior to backfill activities.

- The work crew chief must notify the BLM wildlife team lead if California condors visit the worksite while construction is underway. Project activities would be modified or delayed where adverse effects to condors may result.
- No hazing or harassment of wildlife is permitted.
- The project site 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 the project site 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.
- Wildlife escape ramps would be secured in each trough before it is filled.
- 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.
- 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.

Soils

- Construction activities would be limited to periods when the soil and ground surface are not wet to avoid soil compaction.
- During construction or maintenance, vehicular traffic would be restricted to existing roads or along the 15-foot-wide route of the pipeline and fences.
- To minimize impacts to biological soils crusts, care would be taken during construction activities to avoid disturbance of this resource to the greatest extent practicable. This may involve slight adjustments for construction equipment access and/or final locations, within the areas "cleared" for cultural resources and special status species.

Vegetation including Invasive Species

- Construction activities would be conducted in a manner that would minimize disturbance to existing vegetation by limiting vegetation thinning and restricting construction and maintenance activities to a 15-foot-wide path.
- 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 for noxious weeds for two years following completion of the 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.

Hazmat

- 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.

Cultural Resources

- An intensive-level archeological inventory (Class III) shall be required in the event the proposed project location moves or additional ground disturbing activities are added to the proposed project. Any such inventory would have to be completed prior to the start or continuation of the proposed project.
- Any cultural (historic/prehistoric site or object) or paleontological resource (fossil remains of plants or animals) discovered in the project area would immediately be reported to the Arizona Strip Field Office Manager or 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, construction or maintenance 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 designee) would be immediately notified. The immediate area of the discovery would be protected until notified by the Arizona Strip Field Office Manager (or designee) that operations may resume.

Visual Resources

- The proposed action would locate new tanks and other structures behind existing earth berms or vegetation, to minimize the visibility of these structures from the view of the casual observer.
- Troughs, tanks, and other structures would be placed within existing disturbed areas where possible to reduce visual effects.
- All water storage tanks would be placed on their sides and painted to blend into their surrounding landscapes. Recommended colors are Juniper Green or Carlsbad Canyon, depending on which color better matches the surrounding landscape.
- The location and design, as well as the methods used to minimize the view of the proposed water tanks and troughs, would be considered on a case-by-case basis by the authorized officer and the permittee to determine the best way to meet Visual Resource Management (VRM) class II and III objectives.

2.2.2 Monitoring

Monitoring under the proposed action would consist of a BLM staff member inspecting the project sites during construction to ensure compliance with the listed BMPs. Monitoring for the invasion of noxious weeds would continue for a minimum of two years following completion of the project by BLM personnel. The project would be monitored on a yearly basis by the grazing permittee to ensure the fences, pipeline, troughs, and storage tanks are functioning properly. In addition, rangeland monitoring (to evaluate compliance, utilization, composition, and long-term trend) would continue in the allotment which would help determine the effectiveness of the project. 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.

2.3 Alternative B – No Action

Under the no action alternative, the proposed fences, pipeline, water storage tanks, and troughs would not be installed on BLM administered lands. Grazing would continue in the Clayhole Allotment without the addition of any new rangeland improvement projects to promote better livestock distribution and more even utilization.

2.4 Alternatives Considered but Eliminated from Detailed Analysis

2.4.1 Construct Earthen Reservoirs

Under this alternative, earthen reservoirs would be constructed instead of installing new water storage tanks, pipeline, water troughs and fences. Sixty earthen reservoirs would be developed in the areas where water troughs would be placed in the proposed action. 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 to vegetation and soil, up to 180 acres depending on the reservoir size (see Table 2.3). 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 not address the purpose and need for action and was therefore not carried forward for detailed analysis.

Table 2.3. Acres of Potential Ground and Vegetation Disturbance – Construct Earthen Reservoirs

Improvement	Proposed Number	Proposed miles	New Disturbance	Disturbance in Existing Disturbed Areas, i.e., Roads, Reservoirs, etc.	Total Disturbance
Construct New Earthen Reservoirs	60 3-acre Reservoirs	N/A	130	50	180

2.4.2 Not Authorize the Proposed Water Development, and Instead Reduce or Eliminate Livestock Grazing by Permanently Closing the Allotment.

Under this alternative, the BLM would not authorize the proposed water development, and would eliminate livestock grazing and permanently close the allotment to future livestock grazing (i.e., identify the allotment as unavailable for grazing).

This alternative was eliminated from further analysis because livestock grazing will be evaluated and addressed during the permit renewal process for the Clayhole Allotment. The proposed project is within a grazing allotment that is available for livestock use within the Arizona Strip Field Office RMP, and that has 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 and allotment monitoring data) 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. This alternative is outside the scope of this EA as it would not respond to the purpose and need for action, and is therefore not appropriate for analysis in this EA.

CHAPTER 3

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter provides information to assist the reader in understanding the existing situation, including current grazing management, on the Clayhole Allotment. The affected environment is tiered to the Arizona Strip Proposed RMP/Final EIS (BLM 2007). The affected environment of this EA was considered and analyzed by an interdisciplinary team. Table 3.4 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 below include the relevant physical and biological conditions that may be impacted with implementation of the alternatives and provides the baseline for comparison of impacts described in Chapter 4.

3.2 General Setting

The Arizona Strip is comprised of 2.8 million acres of BLM-administered land in the northwestern portion of Arizona. The Clayhole Allotment (Appendix A, Figure 1) is in Mohave County, Arizona on lands managed by the BLM's Arizona Strip Field Office. The Clayhole Allotment is located approximately 30 miles south of the Town of Colorado City, Arizona.

3.2.1 Topography

The allotment consists of rolling grasslands that are typical throughout Antelope Valley. Elevation ranges from 4,800 to 5,900 feet. The southern end of the allotment consists of basalt and pyroclastic rock fan terraces and hills with sparce pinion-juniper vegetation.

3.2.2 Climate

The climate in and around the allotment is characterized by low rainfall (approximately 9.5 inches annually), mild winters, and warm summers. Temperatures in the region average 30 degrees in winter and 80+ degrees in summer. The climate at the allotment has an average frost-free period of 160 days with temperatures ranging from a high of 105°F in summer to a low of 10°F in winter. Precipitation data on the allotment is taken from three rain gauges located within the allotment boundary. The average precipitation by season for these rain gauges is presented in Table 3.1.

Table 3.1. Clayhole Allotment Precipitation Data

Rain	Fall Average		Winter Average		Spring Average		Summer Average		Annual Average
	Percent of total	Inches	Percent of total	Inches	Percent of total	Inches	Percent of total	Inches	Inches
Upper Clayhole	15	1.55	29	2.88	20	2.01	39	3.87	10.30
Clayhole Exclosure	14	1.4	23	2.3	17	1.7	36	3.6	9.14
South Clayhole	13	1.31	21	2.10	15	1.58	40	3.99	8.97

Precipitation in Arizona typically occurs in a bimodal fashion, with a very dry May and June. Winter moisture is influenced by Pacific oceanic temperatures and airstreams; summer moisture is influenced by the North American monsoon. Summer moisture generally occurs from July through September. It should be recognized that summer rainstorms exhibit considerable variability in their location and intensity (Sprinkle et al. 2007).

Precipitation over the last 25 years has been at or below normal[4] for 13 of those years at the Upper Clayhole and Clayhole Exclosure rain gauges, and below normal for 14 of those years for the South Clayhole Rain Gauge. Precipitation has been above normal for 12 years on the Upper Clayhole and Clayhole Exclosure and 11 years on the South Clayhole rain gauge. The highest precipitation received during that time was in 2005 when annual precipitation was 170% of normal; the lowest was in 2002 when precipitation was 40% of normal. Annual precipitation over the past five years has generally been at or above normal, ranging from 91% to 131% of normal. However, it should be noted that departures from normal are not unusual in fact, departures from normal are quite typical (Doswell 1997), and precipitation may very often be either well above or well below the seasonal average.

3.3 Elements of 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 any of the alternatives. These elements are identified in Table 3.2, 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 3.2 also contains other resources 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.

[4] "At or above normal" for this analysis is considered 95% of average annual precipitation or greater.

Table 3.2. Elements/Resources of the Human Environment

NP = not present in the area impacted by any of the alternative
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 Clayhole Allotment is included in an area that is unclassified for all pollutants and has been designated as Prevention of Significant Deterioration Class II. Although the proposed action could create fugitive dust, this dust creation would be localized and temporary. Thus, neither of the alternatives would cause Class II standards to be exceeded and would therefore not measurably impact air quality. Exhaust from vehicles would have negligible contributions towards concentrations of pollutants such as nitrates, hydrocarbons, or sulfates on a landscape scale.
Areas of Critical Environmental Concern	NI	The proposed action is within a portion of the Moonshine Ridge Area of Critical Environmental Concern (ACEC) established for the protection of Siler pincushion cactus. The pipeline and associated structures lie south of the boundary, outside of the ACEC. The alternatives would not affect management of the ACEC.
Environmental Justice	NI	Minority, low-income populations, and disadvantaged groups may be present within the county and may use public lands within and around the allotment. The alternatives would not cause any disproportionately high and adverse effects on minority or low-income populations, individually or collectively because there are no exposure pathways by which any population would come into contact with environmental or health hazards that would result in chemical, biological, physical, or radiological effects.
Farmlands (Prime or Unique)	NP	Prime farmland is described as farmland with resources available to sustain high levels of production. In the southwest, it normally requires irrigation to make prime farmland. In general, prime farmland has a dependable water supply, a favorable temperature and growing season, acceptable levels of acidity or alkalinity, an acceptable content of salt and sodium, and few or no rocks. Based on these definitions, no prime or unique farmlands exist anywhere within the Arizona Strip Field Office, including within this allotment.
Floodplains	NI	There are no proposed actions that would result in permanent fills or diversions or placement of permanent facilities in floodplains or special flood hazard areas. The alternatives would not affect the function of the floodplains within this allotment.
Native American Religious Concerns	NI	The proposed action is not expected to limit access to or ceremonial use of Native American sacred sites, or affect the physical integrity of such sites.
Threatened, Endangered or Candidate Plant Species	NI	Siler pincushion cactus (*Pediocactus sileri*) occurs in four populations in the Clayhole Allotment, in the Childer's Well and Big Warren pastures where the proposed project would occur. These populations occur between one and two thousand feet from the proposed pipeline route. The pipeline would follow an existing road wherever possible to minimize new disturbance. The proposed troughs would avoid these populations and would be located over ½ mile away from the population and therefore would not directly affect this plant. It should be noted that cattle already access the area where improved livestock distribution is sought – the proposed action would not introduce grazing into an area where it has not previously occurred, but the proposed action would

Resource	Determination	Rationale for Determination
		help keep cattle away from the known populations. While the populations of *P. sileri* within the allotment are not regularly monitored, long term monitoring of other P. *sileri* populations on the Arizona Strip has shown that this plant has been minimally affected by livestock; *P. sileri* populations are instead influenced by timing and amount of precipitation received. For example, a *P. sileri* monitoring plot located in the Atkin Well Allotment is approximately 100 yards from an existing water source; the plot is monitored annually and has demonstrated trampling by livestock has occurred on one cactus - one time in 1994. The BLM has therefore determined that the populations of *P. sileri* in the Clayhole Allotment would demonstrate a similar lack of impacts from cattle trampling since the proposed troughs would be located further away from the cactus. It has also been determined that the proposed pipeline and troughs, while present in the same pastures as the plant populations, would not affect these populations. There are no other ESA-listed plant species, or designated critical habitat for these species, that occur in the project areas or would be affected by the alternatives.
Threatened, Endangered or Candidate Animal Species	NI	There are no areas within the Clayhole Allotment that lie within any critical habitat that has been designated or proposed under the ESA. The California condor is the only known federally listed animal species that may occur within this allotment – condors may occasionally fly over or feed in the allotment 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 Endangered Species Act. 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 Clayhole Allotment, they have not been observed doing so. There is no evidence that rangeland health on this allotment is limiting or restricting condor population growth. Thus, no effect to this species is expected from either of the alternatives.
Cultural Resources	NI	Class III (intensive level) cultural resources inventories would be conducted prior to project implementation. In the event that cultural resources are encountered during these inventories, analyses would be conducted so as to avoid the cultural resource(s). This may include relocating the proposed range improvement (i.e., segment of pipeline, trough) to outside of the established boundary of the cultural resource or excluding that improvement from consideration so as to avoid the cultural resource(s). If avoidance cannot occur, consultation with the Arizona State Historic Preservation Officer and, potentially, affected Tribes, would occur for that cultural resource(s) prior to authorization of that proposed range improvement. These consultations would determine if there is an adverse impact to a resource and the method as to which this adverse impact would be mitigated.
Invasive, Non-native Species	NI	The invasive annual grass, cheatgrass (*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

Resource	Determination	Rationale for Determination
		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 seed implementation by grazing herbivores, and 2) grazing removes senescent plant material, and if not extreme, helps open 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 Clayhole Allotment – see discussion on rangeland health in Section 3.2.1 of this EA) should minimize or have no effect on the spread of cheatgrass and other invasive non-native species. Several known populations of Scotch thistle are found within the Clayhole Allotment near the proposed project area. These populations would continue to be monitored and treated, as necessary.
Wastes (hazardous or solid)	NP	No known hazardous or solid waste issues occur near this project area, and the alternatives would not produce hazardous or solid waste. While motorized vehicles involve use of petroleum products, which are classified as hazardous materials, there is nothing unique about the actions associated with the alternatives which could affect their use or risks associated with their use. No chemicals subject to reporting under Superfund Amendments and Reauthorization Act, Title III in an amount equal to or greater than 10,000 pounds would be used, produced, stored, transported, or disposed of annually in association with any of the alternatives. Furthermore, no extremely hazardous substances, as defined in 40 CFR 355, in threshold planning quantities, would be used, produced, stored, transported, or disposed of in association with either of the alternatives.
Water Quality (drinking / ground)	NI	No surface water within this allotment is used for domestic drinking. Thus, no effect to water quality is expected from the proposed action.
Wetlands / Riparian Zones	NI	The Federal Geographic Data Committee, Wetlands Classification Standard (WCS) defines “wetlands” according to Cowardin et al. (1979): Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year. There are several wetlands present and classified by the National Wetlands Inventory within the Clayhole Allotment. However, no new surface disturbing activities (i.e., pipelines or troughs) would be placed or cross these areas. Therefore, no effect to wetlands is expected from the proposed action.

Resource	Determination	Rationale for Determination
Wild and Scenic Rivers	NP	There are no river segments within the project area that are designated, eligible, or suitable as wild, scenic, or recreational under the Wild and Scenic Rivers Act.
Wilderness	NP	There is no designated wilderness within the Clayhole Allotment.
Livestock Grazing	PI	The purpose of the proposed water developments is to provide more reliable waters in the Clayhole Allotment, which would result in a more uniform distribution of livestock and utilization of forage throughout all the allotment. This issue is therefore analyzed in detail in this EA.
Woodland / Forestry	NI	Pinyon-juniper woodlands exist in the Clayhole Allotment in the South Pasture along the route where the pipeline, water tanks and troughs would occur. However, the proposed project would avoid trees wherever possible, so alteration of the forest structure would not occur, other than potential removal of a few individual trees. The pipeline follows roads where possible and would avoid pinyon-juniper trees. 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 water tanks, troughs, and along the routes of the pipelines would occur during installation. 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.
Sensitive Plant Species	NI	There are no known populations of BLM or State sensitive plant species within the project area. The proposed action would therefore not affect this resource.
Wildlife (including sensitive species and migratory birds)	PI	Disturbance to wildlife, including migratory birds and sensitive species, could occur during construction caused by the potential short-term loss of vegetation for food and cover, and short-term noise from construction activities. Long-term effects to wildlife could result from having to navigate additional fences. Wildlife could also be affected in the long-term by providing additional (and more reliable) water sources. This issue is therefore analyzed in detail later in this EA.
Soil Resources	NI	Construction of these water storage tanks, pipeline, and fence would cause minimal disturbance to the soil resource (including biological soil crusts) – a total of approximately 112 acres would be directly disturbed (which is less than 0.001% of the total area of the allotment). In addition, measures are incorporated into the proposed action (such as construction activities being limited to periods when the soil is dry) that would minimize impacts to soil resources. Passage of rubber tires and cleats from the crawler tractor could cause some temporary soil compaction. 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. The grazing management system for this 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

Resource	Determination	Rationale for Determination
		the vegetative resource that provides soil cover and reduces potential erosion throughout the allotments and pastures.
Recreation	NI	The Clayhole Allotment is within the Arizona Strip Extensive Recreation Management Area and receives custodial management for dispersed, unstructured recreation opportunities that focus only on visitor health and safety, user conflict, and resource protection issues while maintaining Most of the area within the allotment is within the Rural Travel Management Area which is managed to provide for the widest variety of motorized, non-motorized, and mechanical travel modes to serve existing and future recreational, traditional, casual, commercial, educational, and private needs adjacent to communities, but not to the detriment or exclusion of the protection of resources. The allotment is managed to provide for a variety of motorized, non-motorized, and mechanical travel modes to serve existing and future recreational, traditional, casual, commercial, and private needs in a range of settings from entry to communities to remote and rustic settings, but not to the detriment or exclusion of the protection of resources. The allotment is considered to have recreation values primarily for its geology and remoteness. Visitors to the allotment engage in a variety of recreation activities including sightseeing, horseback riding, hiking, camping, backpacking, canyoneering, hunting, rock collecting, photography, bird watching, nature study, and vehicle exploring, although recreational use is relatively low. While some users may be temporarily displaced during construction of the proposed water developments, these activities would be temporary. In addition, the size of the water developments would be very small when considering the large amount of similar landscape in the area. Thus, the alternatives are not expected to impact the availability of recreational opportunities within the allotment.
Visual Resources	NI	The proposed project location would mostly be within areas designated as VRM class III, where the proposed action should not attract the attention of the casual observer. The buried pipeline would, in the long-term, meet VRM Class III objectives once vegetation is re-established. Some of the tanks and troughs are currently located a distance from the road such that the structures would not attract the attention of the casual observer. The tanks and troughs closest to the road already have tanks and toughs in place. All tanks would be painted to match their surrounding landscapes. Where the new proposed tanks are close to the road, they would be located behind earth tank berms to minimize their added visual elements to the landscape. By painting tanks and masking the tanks behind berms, the tanks would not dominate the views by the casual observer, and therefore would meet VRM Class III objectives. VRM Class II exists around the Dominguez-Escalante Historic Trail. In these areas, the proposed water structures would not be visible to the casual observer due to the structures being hidden behind earth tank berms along roads not normally driven by the public.
Geology / Mineral Resources / Energy Production	NI	There is no energy production on the Arizona Strip Field Office. A records search of LR2000 on August 19, 2020, found no leasable or locatable minerals authorizations. There are active mining claims and an authorized free use permit (AZA036446) in the Clayhole Allotment. The alternatives would not alter geological features or mineral resources. Mining activities are occurring

Resource	Determination	Rationale for Determination
		across the Arizona Strip, but the alternatives would not alter or impair the opportunities to explore for or mine mineral resources.
Paleontology	NI	The Potential Fossil Yield Classifications (PFYC) for surface deposits in the Clayhole Allotment include: 1 (Very Low), 2 (Low), 3 (Moderate), 4 (High) and U (Unknown). The alternatives would not affect any deposits with High PFYC ratings. The potential for significant or vertebrate fossils is low. No known paleontological resources are known to exist in the Clayhole Allotment.
Lands / Access	NI	A portion of the proposed pipeline would be buried in the Antelope Valley Road, which Mohave County holds right-of-way grant AZA023224 for. Mohave County was notified of this project and given an opportunity to comment and had no issues.
Fuels / Fire Management	NI	No hazardous fuel reduction or fuels management projects are proposed for the area. Installation of the proposed water developments 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. The authorization to install approximately 90 miles of pipeline, water storage tanks, fencing, and the maintenance of these structures would allow historical and traditional uses of the land to be maintained. The alternatives would have no overall effect on the economy of the county since other industries and tourism/recreational uses are contributing increasing amounts to the economy of the region and cattle ranching is no longer a significant contributor. Quantifiable additional or decreased economic impacts to the local area would not be affected by either of the alternatives.
Wild Horses and Burros	NP	The proposed project area is not within a wild horse or burro herd management areas, and no wild horses or burros occur within the Clayhole Allotment.
Lands Managed to Maintain Wilderness Characteristics	NP	There are no areas managed to maintain the wilderness characteristics of naturalness, opportunities for solitude, and opportunities for primitive and unconfined recreation within the allotment.

3.4 Resources Brought Forward for Analysis

3.4.1 Livestock Grazing

The Clayhole Allotment is split into 13 pastures and a “best pasture” grazing system is utilized. Each year the area livestock are rotated into is reviewed 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 holding pasture is used for separation and shipping purposes. One of the proposed fences would add another holding pasture that would also be used for this purpose (Appendix A, Figure 8).

The main sources of water on the Clayhole Allotment are provided by large earthen ponds or reservoirs built along dry washes or drainages throughout the allotment. However, these ponds do 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. There are also two working wells and the Yellowstone Spring which supplements water in the ponds.

Table 3.3. Clayhole Allotment Land Ownership

Ownership	Acres
Federal	102,937 acres
State	12,335 acres
Private	280 acres
Total	115,552 acres

Table 3.4. Clayhole Allotment Permitted Season and AUMs.

Livestock Number	Kind	Grazing Season		% Public Land	Use Type	AUMS
		Begin	End			
908	Cattle	12/01	11/30	86	ACTIVE	9,371

Table 3.5. Clayhole Allotment Pasture Acres

Pasture	Acres
Big Warren	6,373
Childer's Well	20,112
RCA	4,445
Little Clayhole	21,373
Bundy Pond	15,399
Larimore	16,485
Holding	1,374
South	8,068
Little Warren 5A	9,060
Little Warren 5B	6,473
Little Warren 5C	2,554
Little Warren 5D	2,555
Little Warren 5E	1,281
Total	**115,552**

Land Health Evaluation

The land health evaluation for this allotment was signed in 2008. It was recommended by the interdisciplinary assessment team that the allotment is making significant progress toward meeting standards for rangeland health. The evaluation identified desired plant community objectives for the Clayhole Allotment and determined that these objectives are partially met. Long-term trend monitoring in conjunction with composition and utilization monitoring conducted since the evaluation document was signed reconfirms the 2008 land health evaluation recommendation for this allotment.

While these proposed water developments were not specifically identified in the land health evaluation, lack of reliable water for wildlife was identified as an issue; additional water sources would result in more uniform distribution of livestock, and thus more uniform utilization of forage and more even use within each pasture, which should benefit rangeland health. In addition, as described in Section 1.2 of this EA, the proposed project would also provide additional water sources for wildlife (including mule deer and pronghorn), which has been identified in both the *Arizona Strip Interdisciplinary Mule Deer Management Plan 2015-2019* and the *Arizona Statewide Pronghorn Management Plan*, which would also be beneficial to land health and RMP objectives.

3.4.2 Vegetation

The project area is located within the Plains Grassland and the Great Basin Ecological Zones. The Plains Grassland Ecological Zone vegetation consists of mostly open grassland composed of a variety of perennial grasses, scattered shrubs, and various annual and perennial forbs. Shrubs scattered throughout the area include winterfat, shadscale, fourwing saltbush, Mormon tea, and spiny hopsage. Vegetation in the Great Basin Ecological Zone (Sagebrush Communities) consists of shrub dominated communities, primarily Wyoming big sagebrush (although some scattered pinyon pine and juniper trees are present). Key species within this allotment include galleta, sand dropseed, Indian ricegrass, squirreltail, blue grama, black grama, needle and thread, alkali sacaton, winterfat, Mormon tea, and four-wing saltbush.

According to the NRCS, the dominant ecological sites on the Clayhole Allotment are sandy loam upland gypsic (7-11" p.z.) and gyp upland (7-11" p.z.), Loamy Upland (7-11" pz), and Gyp Hills (7-11" pz). Small inclusions of other ecological sites occur within the allotment. There are two principal vegetative types within the allotment – grassland and desert shrub. Galleta grass (*Hilaria jamesii*) is the predominant grass species throughout the allotment. Other grasses present include blue grama (*Bouteloua gracilis*), black grama (*Bouteloua eriopoda*) sand dropseed (*Sporobolus cryptandrus*), and needle and thread (*Hesperostipa comata*). Indian ricegrass (*Achnatherum hymenoides)* grows in minor amounts in some areas of the allotment. Shrubs scattered throughout the area in the grassland ecological sites include winterfat (*Ceratoides lanata*), shadscale (*Atriplex confertifolia*), fourwing saltbush (*Atriplex canescens*), Mormon tea (*Ephedra virdis*), and spiny hopsage (*Grayia spinosa*). The desert shrub vegetative type consists of fourwing saltbush (*Atriplex canescens*), winterfat, Mormon tea, sagebrush (*Artemisis sp.)*, and forb species such as globemallow (*Sphaeralcea sp.*), and desert trumpet (*Eriogonum inflatum*).

3.4.3 Wildlife Including Mule Deer, Pronghorn, Migratory Birds and Sensitive Species

Big Game

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. Mule deer inhabit several different habitat types on the Arizona Strip including ponderosa pine, pinyon-juniper, sagebrush, chaparral, riparian corridors, and steep canyons. They are rarely found in low-elevation desert scrub habitats. Mule deer often bed in juniper thickets, Gambel oak stands, 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 project area is located within the "Limited" and "Yearlong" habitat category. AGFD considers the mule deer population across the Arizona Strip 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 & Mossman 1996). Water developments appear to increase mule deer populations (deVos & Clarkson 1990). Thus, numerous waters have been developed to improve mule deer distribution across the landscape and to sustain healthy populations, although AGFD has proposed additional waters for wildlife.

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). Habitat quality in the project area is primarily rated as "Moderate" with small pockets of "High" and "Low" scattered throughout.

Migratory Birds

The Migratory Bird Treaty Act of 1918 protects against the take of migratory birds, their nests, and eggs, except as permitted. A Memorandum of Understanding 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 reasonable

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 & 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 2021 (USFWS 2021) is the most recent effort to carry out this mandate. Bird species considered for the Birds of Conservation Concern 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 type of the project area are summarized in Table 3.6. Several of these species are also considered BLM sensitive species (identified as such in the table) and are addressed in the following section.

Table 3.6. USFWS Birds of Conservation Concern Associated with the Clayhole Allotment

Species	Habitat Type in the Project Area
Ferruginous Hawk	Open grassland or shrubland with isolated trees (typically juniper) for nesting. (*BLM Sensitive*)
Golden Eagle	Habitat generalist, but usually forages in open country for small mammals and carrion. Large cliff faces are used for nesting. (*BLM Sensitive*)
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. (*BLM Sensitive*)
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. (*BLM Sensitive*)
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.
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.
Long-eared Owl	Roost in dense vegetation and forage in open grasslands or shrublands. In western states nests in willows, cottonwoods, and junipers adjacent to shrub steppe.
Cassin's Finch	Small flocks sporadically occur in the 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.
Pinyon Jay	Considered a pinyon-juniper obligate and a year-round resident of pinyon-juniper woodlands with areas of open structure containing mixed shrubs (especially sagebrush) and grasses. Found year-round on the Arizona Strip. *(BLM Sensitive)*

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 the project area and that may be affected by actions proposed in one of the alternatives presented in Chapter 2 are displayed in Table 3.7.

Table 3.7. Sensitive Species That May Occur in the Project Area

Species	Potential for Occurrence
American peregrine falcon (*Falco peregrinus*)	Verified
Ferruginous hawk (*Buteo regalis*)	Verified
Western burrowing owl (*Athene cunicularia hypugea*)	Verified
Golden eagle (*Aquila chrysaetos*)	Verified
Pinyon Jay (*Gymnorhinus cyanocephalus*)	Verified
Monarch Butterfly (*Danaus plexippus*)	Potential
Allen's Big-eared Bat (*Idionycteris phyllotis*)	Potential
Townsend's Big-eared Bat (*Corynorhinus townsendii*)	Potential
Spotted Bat (*Euderma maculatum*)	Potential

Additional sensitive species may also occur within the project area. 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 3.8 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 area were not analyzed.

Table 3.8. Sensitive Species Not Further Analyzed in Detail

Species	Rationale for Excluding from Further Analysis
Greater Western Mastiff Bat (*Eumops perotis californicus*)	The largest bat occurring in the United States. Found in desert scrub near cliffs, preferring rugged rocky canyons with abundant crevices. Colonies prefer crevices to ten or more feet. These bats prefer to wedge themselves in the backs of cracks or crevices where they narrow down considerably. Because its wing structure is adapted for fast and straight-line flight, it is unable to drink from water sources less than 100 feet long, such as the proposed livestock troughs.
California Leaf-nosed Bat (*Macrotus Californicus*)	This species typically occurs mostly in Sonoran Desert scrub at elevations between 160–3,980 feet. Primarily roosts in mines, caves, and rock shelters. Prefer roost sites with a large ceiling area and flying space. Unlikely to occur - vegetation in the project area is not similar to those areas where this species is typically found and the project area is above the known elevational range of this species.
Arizona Myotis (*Myotis occultus*)	Found near water in ponderosa pine and oak-pine woodlands habitat, and in desert areas with riparian forests or permanent water. Most commonly occurs at 6,000–9,200 feet but has been found at 150–1,000 feet. Unlikely to occur - vegetation in the project area is not similar to those areas where this species occurs; this species is typically found near water along the Mogollon Rim from Flagstaff to the New Mexico border.
Cave Myotis (*Myotis velifer*)	Typically found in desert scrub vegetation with creosote, brittlebush, palo verde and cacti. Roosts in caves, tunnels, and mine shafts, and under bridges within a few miles of water. Primarily occurs south of the Mogollon Plateau between 300 to 5,000 feet. Feeds on small moths, weevils, antlions, and small beetles. Unlikely to occur - vegetation in the project area is not similar to those areas where this species is typically found.
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 the project area.
Northern Goshawk (*Accipiter gentilis*)	Habitat for this species is not present in the project area. 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 the project area.
Bald Eagle (*Haliaeetus leucocephalus*)	Bald eagles may be found in the project area 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 existing 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 the project area.

Spring Snails (4 species)	These species are restricted to very small ranges and are not known to occur in or near the footprint of the project area.

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 2002).

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 2002). Potential nesting habitat is found along the steep cliff faces of the Hurricane Cliffs.

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 (Stahlecker et al. 2009). 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 area for hunting and scavenging. Potential nesting sites are found along the steep cliff faces on the Hurricane Cliffs and on Yellowstone Mesa near the Clayhole Allotment. 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 area, especially during the winter when they are common. Although nesting habitat is available, especially near the no nest sites are known to occur within one mile of the project area.

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) but the control of burrowing rodent colonies in grazed areas is believed to be a significant factor in the burrowing owl's decline (Desmond and Savidge 1996). 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 2001a). 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 project area. 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 & 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 & 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).

Scattered open structure of pinyon-juniper trees and shrubs (especially sagebrush) and grasses found in the Clayhole Allotment likely support habitat and foraging opportunities for pinyon jays. Pinyon jays have also been documented using wildlife drinkers in New Mexico (Johnson et al. 2012), and at other catchments on the Arizona Strip.

Monarch Butterfly (*Danaus plexippus*)

Monarch butterflies breed throughout the United States, absent only from the forests of the Pacific Northwest. Breeding densities are highest from the east coast to the Great Plains, with

typically low densities in the western states. Migration corridors are found east of the Rocky Mountains, in the Great Basin, and within California. Wintering areas are located along the California coast and in Mexico (Jepsen et al. 2015). Over the past 20 years a 90% decline in wintering monarchs has been detected in Mexico along with a 50% decline noted in California, leading to a petition for listing under the Endangered Species Act. On December 15, 2020, the USFWS announced that listing the monarch as endangered or threatened under the Endangered Species Act is warranted but precluded by higher priority listing actions. The monarch is now a candidate under the Endangered Species Act and will be reviewed annually by the USFWS until a listing decision is made (USFWS 2021).

Monarch larvae feed exclusively on 27 species of milkweed which can be found in a variety of habitats such as rangelands, agricultural areas, riparian zones, wetlands, deserts, and woodlands. In the western U.S. the two most important larval food sources are narrow-leaved milkweed (*Asclepias fascicularis*) and showy milkweed (*A. speciosa*). Adult monarchs forage on a wide variety of flowering plants for nectar during migration periods (Brower et al. 2006).

Monarchs may breed in low numbers within the project area, although documentation is lacking. Milkweed species are present, including showy milkweed. Migrating monarchs have been observed on the Arizona Strip in the fall in areas outside of those analyzed in this EA.

Allen's Big-eared Bat (*Idionycteris phyllotis*)

Allen's big-eared bats usually inhabit forested areas of the mountainous southwest and are relatively common in pine-oak forested canyons and coniferous forests; however, they also may occur in non-forested, arid habitats. At most sites where this species occurs, cliffs, outcroppings, boulder piles, or lava flows are found nearby. Day roosts may include rock shelters, caves, trees and mines. Their elevational distribution ranges from 1,320 to 9,800 feet, and their main food source is small moths gleaned from surfaces or in flight (AGFD 2001b). This bat is known to use stock ponds as water and food sources (Herder 1996). Allen's big-eared bats have been captured at ten mist-net locations on the Arizona Strip.

Townsend's Big-Eared Bat (*Corynorhinus townsendii*)

The Townsend's big-eared bat uses a variety of habitats, almost always near caves or other roosting areas. It can be found in pine forests and arid desert scrub habitats. When roosting it does not tuck itself into cracks and crevices, like many bat species do, but prefers large open areas. It specializes in eating moths and other insects such as beetles, flies and wasps (Arizona-Sonora Desert Museum 2011). In Arizona, summer day roosts are found in caves and mines from desertscrub up to woodlands and coniferous forests. Night roosts may often be in abandoned buildings. In winter, they hibernate in cold caves, lava tubes and mines mostly in uplands and mountains from the vicinity of the Grand Canyon to the southeastern part of the state (AGFD 2003b). These bats prefer to hang from open ceilings in caves or mines and do not use crevices. Townsend's big-eared bats have been captured at 28 mist-net locations on the Arizona Strip and have been recorded by acoustic monitoring stations on the Paria Plateau.

Spotted Bat (*Euderma maculatum*)

Spotted bats have been found from low desert in southwestern Arizona to high desert and riparian habitats in northwestern Arizona and Utah to conifer forests in northern Arizona and other western states. They are found in desert scrub, riparian, pinyon-juniper, and montane coniferous forests at elevations up to 8,670 feet. They roost in small cracks found in cliffs and stony outcrops. These bats forage on large flying insects, primarily moths (AGFD 2003a). Spotted bats have been captured at 11 mist-net locations on the Arizona Strip.

CHAPTER 4

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

The potential consequences or effects of implementing both alternatives are discussed in this chapter. If an ecological component is not discussed, it is because BLM resource specialists considered effects to the component and determined that the alternatives would have minimal or no effects (see Table 3.2). 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.

4.2 Direct and Indirect Impacts

4.2.1 Livestock Grazing

4.2.1.1 Alternative A – Proposed Action

Implementation of the proposed action would result in a more uniform distribution of livestock within the Clayhole Allotment by providing reliable waters in most years. The proposed action would assist the livestock operator and the BLM to plan and adhere to the AMP and provide some degree of stability for the permittee's livestock operation. The proposed action to install a water pipeline, water storage tanks, and water troughs would have a direct impact by providing reliable sources of water at the appropriate times for livestock within each pasture. The indirect impact of the proposed action would be to distribute livestock more evenly within the pastures by having water available within each pasture. The proposed action would enable the use of different portions of the pastures at different times, thus enhancing grazing system identified in the existing AMP.

As described in the purpose and need (Section 1.2) of this EA, water distribution within the 13 pastures is limited due to the existing reservoirs being unreliable, dependent on rainfall events to refill, lack in water storage capabilities, and leak due to the inability of soils to retain water. Currently, there are six large reservoirs within the allotment that historically hold water. Other reliable water sources include Yellowstone Spring, Clayhole Well, and Black Point Well. The current locations of the reliable water sources listed above do not provide adequate water distribution throughout the allotment.

Having reliable water helps ensure that pasture rotations occur as planned and provides more reliable deferment and rest of pastures for vegetation, which help maintain the desired plant

composition objectives that were identified in the land health evaluation and therefore rangeland health within each pasture (see Section 4.3.1).

4.2.1.2 Alternative B – No Action

Under the no action alternative, the installation of the pipeline, troughs, and water storage tanks would not occur. Livestock use in the Clayhole Allotment would continue to be distributed unevenly across the13 pastures. Livestock would continue to graze primarily near current water sources, so those areas would continue to receive a disproportionate share of the grazing utilization. Overall utilization across each pasture would not exceed 50%, although utilization would be unevenly distributed as other areas of the allotment would receive little grazing. The permittee would continue to move livestock to other areas of each pasture however, the livestock would drift back to the areas near the current water sources. Not having reliable water sources would continue to make it difficult to adhere to the established grazing systems outlined in the AMP when the earthen reservoirs are dry, due to the unreliability of scattered summer rainfall events and capabilities of reservoir storage.

4.2.2 Vegetation

4.2.2.1 Alternative A – Proposed Action

Table 2.2 lists the acres of potential ground and vegetation disturbance for the proposed project. The information in this table represents the temporary disturbance during construction of the proposed project; temporary (construction) disturbance would be approximately 112 acres. The pipeline and fence areas would revegetate over time resulting in the permanent loss of vegetation on approximately 7.5 acres.

A crawler tractor with ripper tooth attached and lowered into the ground would be driven across the route of the 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 2.2.1 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 would be constructed using heavy equipment sized tires and secured to the proposed location using concrete. Where troughs are placed in new locations (i.e., not within existing reservoir sites where disturbance has already occurred), 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 system on this allotment utilizes a "best pasture" grazing system in which the area where livestock are rotated into each year is reviewed 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). This allows 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 grazing system to be fully implemented. The proposed action would result in more reliable water sources across the allotment, and therefore benefit vegetation throughout the allotment as described above.

High use would occur on vegetation near troughs; however, the scope of these impacts would be limited because many of the troughs would be located either next to existing reservoirs or along existing roads, and most (76 of 92 total miles) of the proposed pipeline 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 allotment from the proposed project. 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 the allotment would be maintained and/or improved.

The proposed action includes construction of approximately two miles of fence to create a small holding pasture that could be used when working cattle at the Cabin Valley Corral. Fences would also be constructed around Bundy Pond, Nyborg, and Cement Dam. All fences would be type "A" fence, which is a 42-inch high, four wire strand, wildlife passable fence. The fences would have 16½ -foot spacing between steel posts with two metal stays between posts. Wooden braces would be installed at each end of the fence, at fence corners, and at quarter mile intervals along the fence line. A posthole digger mounted on a rubber-tired tractor would be used to dig holes for the brace posts. Access to 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 these factors would thus facilitate perennial vegetative recovery and response in disturbed areas as a result of fence construction and maintenance.

The proposed action would improve the management of livestock as specified in the AMP and benefit rangeland health by providing reliable year-round water sources. This, in turn, would disperse livestock throughout each pasture instead of congregating livestock around the unfenced reservoirs, which are often the only available water sources during the summer months. Cattle would be better able to access areas within the allotment which have been underutilized due to distance from water and reduce the utilization of forage near current reliable water sources, resulting in a more uniform utilization of forage while not exceeding the maximum utilization level of 50%.

4.2.2.2 Alternative B – No Action

Under the no action alternative, no pipeline, storage tanks, troughs, or fences would be installed; the acreages listed in Table 2.2 would receive no additional (short or long-term) impacts. Vegetation would not be crushed or trampled by rubber tires from trucks or cleats from tractors, and vegetation would not be uprooted by the ripper tooth from pipeline installation or in clearing a spot for the fences, storage facilities, or troughs. However, the overall condition of vegetation in this allotment may not improve, or may not improve as quickly, since the livestock distribution and patterns would remain as they currently are. Livestock distribution and uniform utilization in each pasture would continue to be limited due to the location of available water. This would not allow the vegetation in each pasture to better progress toward its natural potential. Thus, ecological status for these pastures would remain the same, or would progress more slowly.

4.2.3 Wildlife Including Mule Deer, Pronghorn, Migratory Birds and Sensitive Species

4.2.3.1 Alternative A – Proposed Action

Water is essential for all animals. Wildlife populations in general and mule deer, pronghorn, and migratory birds 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 Clayhole Allotment, reliable waters can be beneficial in combination with adequate foraging areas (Rosenstock et al. 1999). Wildlife will traditionally use "artificial" water developments during the hottest, driest months of the year when ephemeral water sources dry up.

Big Game

Mule Deer

Construction activities would result in approximately 112 acres of short-term disturbance to habitat (see Table 2.2). After construction is completed, the area of long-term disturbance would be minimal (7.5 acres, or 0.001 percent of the acres within the allotment). The proposed water developments have been designed to minimize impacts to vegetation by restricting construction activities to the 15-foot-wide route. This is a negligible loss of habitat, compared with the relative amount of habitat available in the surrounding landscape. 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 4.2.2.1).

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 (i.e., yearlong water availability and distribution). In addition, any fences constructed around the waters would be built to AGFD wildlife specifications to ensure safe passage by mule deer and other wildlife species. While there would be more impact to vegetation (i.e., habitat) close to water, the scope of these impacts would be limited because the many of the new troughs would either be located at existing reservoirs or along existing roads, and the majority of the proposed pipeline (76 of 92 total miles) would also be along existing roads, where disturbance to vegetation has already occurred. (See Section 4.2.2.1 for more detailed discussion on impacts to vegetation from the proposed action.) The grazing management system identified 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 are completed and troughs are installed, the availability of water would be improved and made available yearlong, which would improve distribution and use in the area. The long-term benefits of additional reliable water sources for mule deer would outweigh any short-term adverse impacts that could result from construction.

Pronghorn

Impacts to pronghorn would be similar to those described for mule deer. 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. 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. In addition, any fences constructed around the waters would be built to AGFD wildlife specifications to ensure safe passage by pronghorn and other wildlife species. Impacts to pronghorn would be minimized by implementing the best management practices listed in Section 2.2.1. Although pronghorn would be temporarily displaced, once the pipelines are completed and troughs are installed the availability of water would be improved (including being available year-long). This would be particularly beneficial to does during fawning and lactation periods when physiological stresses are greatest. In addition, the long-term benefits of additional reliable water sources for pronghorn would outweigh any short-term adverse impacts that could result from construction.

Migratory Birds

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 2.2.1 (i.e., measures would be taken to protect active bird nests and activities would be limited to daylight hours). 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.

Sensitive Species

American Peregrine Falcon

No nesting sites would be impacted by construction activities and no potential nest sites would be altered by the proposed action. Habitat for peregrine falcon prey species would not be altered. Access to reliable water sources would likely benefit many bird species that peregrine falcon's prey upon. The presence of water developments may benefit peregrine falcons by providing reliable water sources to prey species.

Golden Eagle

No nesting sites would be impacted by construction activities and no potential nest sites would be altered by the proposed action. Impacts to golden eagle prey species habitat would be minimal and limited to the small area of vegetation removal at each water development site. 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 man-made water developments (Rosenstock et al. 2004, O'Brien et al. 2006). The presence of water developments may benefit golden eagles by providing reliable water sources to prey species.

Ferruginous Hawk

No nesting sites would be impacted by construction activities and no potential nest sites would be altered by the proposed action. Impacts to ferruginous hawk prey species habitat would be minimal and limited to the small area of vegetation removal at each water development site. Access to reliable water sources, especially during drought conditions, would benefit many small mammals that ferruginous hawk's prey upon. The presence of water developments may benefit ferruginous hawks by providing reliable water sources to prey species.

Western Burrowing Owl

No nesting sites would be impacted by construction activities and no potential nest sites would be altered by the proposed action. Impacts to burrowing owl prey species habitat would be minimal and limited to the small area of vegetation removal at each water development site. Access to reliable water sources, especially during drought conditions, would benefit many small mammals, reptiles, and birds that burrowing owls prey upon. Burrowing owls are also known to utilize wildlife drinkers (Rosenstock et al. 2004). The presence of water developments may benefit burrowing owls by providing reliable water sources to both the owls and its prey species.

Pinyon Jay

No habitat alteration in pinyon-juniper overstory is proposed at these water developments and pinyon pine seed crops would not be impacted. Pinyon jays may avoid each site during short-term construction disturbance but would have ample undisturbed foraging habitat available. Lynn et al. (2006) observed that resident birds in southwest Arizona frequently utilize water developments 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 (Langston, personal obs.). Reliable water sources located within or near pinyon jay territories during the summer months would benefit pinyon jays.

Monarch Butterfly

Impacts to Monarch habitat would be minimal and limited to the small area of vegetation removal at each catchment site. The installation of water troughs on BLM land in the project area would result in a more uniform utilization of forage, which would aid in maintaining and improving the DPC objectives and could enhance habitat. The uniformity in livestock distribution would enhance rangeland vegetation by accelerating plant succession while increasing plant diversity and vigor (see Section 4.2.2.1).

Allen's Big-eared Bat, Townsend's Big-Eared Bat, and Spotted Bat

Habitat for these bat species would not be impacted because none of the proposed project sites contain suitable roosting habitat such as rock shelters, caves, mines, or cliff crevices.

Disturbance from construction activities would not impact foraging because work would be conducted during daylight hours.

The installation of water troughs on BLM land in the project area could enhance the foraging efforts of these species by providing sources of drinking water (Taylor & Tuttle 2012). These troughs would be placed at an adequate distance from fence lines to provide a clear flight path for bats to utilize these water sources. The proposed water troughs could also benefit these bat species by a localized increase in the number of insects near these water sources.

4.2.3.2 Direct and Indirect Impacts of Alternative B – No Action

Big Game

Mule Deer and Pronghorn

Under this alternative, no construction activities would occur. Therefore, there would be no disturbances including noise or human presence to disrupt these species, and no disturbance to vegetation resulting from installation of the range improvements. No additional water sources would be constructed. Mule deer and pronghorn would not benefit by increased water distribution within the allotment/pastures from the proposed water projects.

Migratory Birds

Under this alternative, no construction activities and, therefore, no additional ground disturbance would occur. 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 availability and distribution from the proposed water project.

Sensitive Species

Under this alternative, no construction activities and, therefore, no additional ground disturbance would occur; therefore, no sensitive species or associated habitat would be affected. Opportunities for sensitive species 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 sensitive species) would be constructed. Thus, these species would not benefit by improved water availability and distribution from the proposed water project.

4.3 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 EA is intended to qualify and quantify the impacts to the environment that result from the incremental impact of the alternatives 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. Specific actions that have occurred, are occurring, or are likely to occur in the reasonably foreseeable future include:

- ***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 – livestock grazing has occurred in the area for 150+ years. The Clayhole Allotment and the adjacent BLM-administered land are active grazing allotments. Each of these allotments is managed under a grazing system that is documented and described in an AMP. In addition, grazing allotments include a variety of range improvements, including water developments. In 2019, a grazing decision was issued to approve the installation of 4.5 miles of pipeline and four water troughs in the Childer's Well Pasture of the Clayhole Allotment in order to provide additional (reliable) water sources in the pasture, and to provide better adherence to the grazing system established in the AMP. Cumulative impacts to livestock grazing are discussed (below) in Section 4.3.1.
- ***Recreation*** – Recreation activities occurring throughout the allotment and adjacent 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 off-highway vehicle (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 provide 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.
- ***Mining and Mineral Resources*** – Public lands within and adjacent to the Clayhole Allotment are open to mineral development. The primary economic mineral resources in the area are salable minerals (consisting primarily of sand, stone, and gravel but also clay), gypsum, and uranium. The potential for gravel is high. Several existing mineral material pits occur in the area.

4.3.1 Cumulative Impacts to Livestock Grazing

The cumulative impact analysis area for livestock grazing is the Clayhole Allotment and adjacent grazing allotments.

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 runoffs 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 actions such as voluntary livestock reductions during dry periods, implementation of grazing systems, and construction of additional livestock water sources to more uniformly distribute livestock 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, which dramatically affected livestock grazing operations on the Arizona Strip, resulting in virtually all livestock being pulled from the public lands in 2004. Similar fluctuations in livestock numbers could occur in the future.

In addition to livestock grazing, there are a wide variety of uses and activities occurring on the lands within and adjacent to the allotment, as described above. Since livestock grazing occurs throughout the area and on adjacent private lands, it is reasonable to assume that impacts like those identified earlier in this chapter would occur elsewhere in the area. Another action not mentioned above that may affect livestock grazing is listing a species as threatened or endangered under the Endangered Species Act, including designating critical habitat. Making areas unavailable for livestock grazing, placing restrictions on season of use, reducing access, or applying other restrictions meant to protect special status species may impact livestock grazing operations through the loss of forage, increased difficulty of access, increased costs of operation, and reduced livestock numbers (BLM 2007).

4.3.2 Cumulative Impacts to Vegetation

The cumulative impact analysis area for vegetation is the Clayhole Allotment.

Vegetation on the Arizona Strip has gone through significant changes since the 1860s 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 includes keeping the entire ecosystem healthy and productive to ensure that it yields both usable products and intrinsic values. In addition, practices currently being implemented (such as weed control efforts) would act to prevent and control the spread of invasive plant species.

There are active mining claims and an authorized free use permit (AZA036446) in the Clayhole Allotment. Mining activities 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.

Past, present, and reasonably foreseeable actions within the analysis area would continue to affect this resource, as described above. However, continuing to monitor plant communities and to implement the Arizona Standards for Rangeland Health would help ensure the long-term health of vegetation. The allotment is currently making significant progress toward meeting the applicable standards for rangeland health (which considers all uses of public rangelands, not just livestock grazing), and neither of the alternatives are anticipated to change that determination.

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 the Clayhole Allotment, and that the proposed facilities would affect less than 1% of the area within the allotment (see Table 2.2), 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.

4.3.3 Cumulative Impacts to Wildlife, Including Mule Deer, Pronghorn, Migratory Birds, and Sensitive Species

Wildlife may be affected by other activities occurring within and adjacent to the Clayhole Allotment, 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 Clayhole Allotment include several active mining claims and an authorized free use permit (AZA036446), as well as 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 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 Clayhole Allotment 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 development and use of range improvements on wildlife resources in the Clayhole Allotment 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 is 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 Monitoring

Dry weight ranking studies would be used to measure attainment of the key area DPC objectives. In addition, pace frequency studies would be used at each key area to detect changes of individual species which determines a trend or change in vegetation composition. Pace frequency and dry weight rank (DWR) studies would be completed on each key area. DWR and pace frequency study methodologies are described in Sampling Vegetation Attributes, Interagency Technical Reference 1734-4 (BLM 1999b). Long-term (trend) monitoring and composition data collection is conducted every five years.

Livestock use on forage plants is determined by conducting grazing utilization studies using the Grazed-Class Method as described in the Utilization Studies and Residual Measurements Interagency Technical Reference 1734-3 (BLM 1999a). In addition, pastures are visited as a part of allotment supervision and compliance, ensuring that livestock are leaving pastures/the allotment when required and/or when utilization limits are reached. Utilization studies would be completed by the BLM when livestock are removed from the pasture. Allotment inspections and utilization monitoring are conducted every year. Study data would be compiled each year. Other information to be collected and compiled includes precipitation and actual use. All monitoring data would be used to evaluate current land health of the allotment and assist the BLM in making management decisions that help achieve vegetation objectives.

The monitoring addressed above and best management practices outlined in Chapter 2 is sufficient to identify changes in vegetation because of livestock grazing activities. In addition to those methods described, there are efforts in place to inventory for noxious weed establishment.

CHAPTER 5

5.0 CONSULTATION AND COORDINATION

5.1 Introduction

This section summarizes the process used to involve individuals, organizations, and government agencies in the preparation of this EA.

5.2 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 January 14, 2021; this scoping letter was sent to all interested publics inviting public comments on the proposal to implement new rangeland improvement projects for a 30-day scoping period. A total of three comment letters were received (see Appendix B for comment responses).

List of Preparers and Reviewers

Table 5.1 List of BLM Preparers/Reviewers

Name	Title	Responsible for the Following Program(s)
Brandt Reese	Project Lead, Range Management Specialist	Vegetation, Grazing Administration, Invasive, Non-Native Species, Soils, Water, Air
Lorraine Christian	Arizona Strip Field Manager	Project Oversight
Brandon Boshell	Monument Manager/Assistant Field Manager	Project Oversight
Gloria Benson	Tribal Liaison	Native American Religious Concerns
Amber Hughes	Planning & Environmental Coordinator	NEPA Compliance
Rody Cox	Geologist	Geology, Minerals
Stephanie Grischkowsky	Wildlife Biologist	Special Status Animals, Wildlife, Riparian
Jace Lambeth	Rangeland Management Specialist	Special Status Plants
Jon Jasper	Outdoor Recreation Planner	Wilderness, Recreation, Visual Resources
Sarah Page	Archaeologist	Cultural Resources
Kendra Thomas	Lands and Realty Specialist	Lands and Realty
Cody Goff	Fire Management Specialist	Fire and Fuels
Ken Shurtz	Surface Protection Specialist	Hazardous Materials

6.0 REFERENCES

Arizona Game and Fish Department (AGFD). 2011. *Arizona Statewide Pronghorn Management Plan*. Phoenix, Arizona.

Arizona Game and Fish Department and U.S. Department of the Interior, Bureau of Land Management (AGFD and BLM). 2015. *Arizona Strip Interdisciplinary Mule Deer Management Plan 2015-2019*.

Arizona Game and Fish Department (AGFD). 2001a. *Athene cunicularis hypugaea.* Western Burrowing Owl. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 7 pp.

Arizona Game and Fish Department (AGFD). 2001b. *Idionycteris phyllotis.* Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

Arizona Game and Fish Department (AGFD). 2002. *Falco peregrinus anatum*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

Arizona Game and Fish Department (AGFD). 2003a. *Euderma maculatum*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona.

Arizona Game and Fish Department (AGFD). 2003b. *Corynorhinus townsendii pallescens*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

Arizona-Sonora Desert Museum. 2011. Animal Fact Sheet: Townsend's Big-Eared Bat. Available at: http://www.desertmuseum.org/kids/bats/townsends.php. Accessed March 24, 2011.

Balda, R.P. and G.C. Bateman. 1971. Flocking and Annual Cycle of the Piñon Jay (*Gymnorhinus cyanocephalus*). The Condor, 73:287-302.

Boroski, B.B. and A.S. Mossman. 1996. Distribution of Mule Deer in Relation to Water Sources in Northern California. *The Journal of Wildlife Management* 60:770-776.

Brower, L. P., L.S. Fink, and P. Walford. 2006. Fueling the fall migration of the monarch butterfly. Integrative and Comparative Biology, 46(6):1123–1142.

Bureau of Land Management (BLM). U.S. Department of the Interior. 2007. Proposed Resource Management Plan/Final EIS for the Arizona Strip Field Office, the Vermilion Cliffs National Monument, and the BLM Portion of the Grand Canyon-Parashant National Monument. Bureau of Land Management, Arizona Strip Field Office.

Bureau of Land Management (BLM). U.S. Department of the Interior. 2008a. *Arizona Strip Field Office Record of Decision and Resource Management Plan.* Arizona Strip Field Office, St. George, Utah.

Bureau of Land Management (BLM). U.S. Department of the Interior. 2008b. *National Environmental Policy Act Handbook,*H-1790-1. Washington, DC.

Bureau of Land Management (BLM). U.S. Department of the Interior. 2011. *Northern Arizona Proposed Withdrawal Final Environmental Impact Statement.* Bureau of Land Management, Arizona Strip District, St. George, Utah.

Bureau of Land Management (BLM) and U.S. Fish and Wildlife Service (USFWS), U.S. Department of the Interior. 2010. Memorandum of Understanding between the U.S. Department of the Interior Bureau of Land Management and the U. S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds. Washington D.C. 13 pp.

Cowardin, L.M., V. Carter V., F.C. Golet, E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service Report No. FWS/OBS/-79/31.Washington, D.C.

Desmond, M.J., and J.A. Savidge. 1996. Factors Influencing Burrowing Owl (*Speotyto cunicularia*) Nest Densities and Numbers in Western Nebraska. *American Midland Naturalist* 136:143-148.

deVos, Jr., J.C. and R.W. Clarkson. 1990. A historic review of Arizona's water developments with discussions on benefits to wildlife, water quality and design considerations, p. 157- 165. In: G.K. Tsukamoto and S.J. Stiver (eds.), Proc. Wildlife Water Development Symposium, 30 Nov.-l Dec. 1988, Las Vegas, Nev. Nevada Chapter The Wildlife. Society, USDI BLM, and Nevada Dept. Wildlife.

Doswell, C. 1997. Misconceptions about what is "normal" for the atmosphere. Cooperative Institute for Mesoscale Meteorological Studies, National Severe Storms Laboratory, Norman, Oklahoma.

Federal Geographic Data Committee. 2013. Classification of wetlands and deep-water habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.

Gabaldon, D.J. 1979. Factors Involved in Nest Site Selection by Piñon Jays. Ph.D. Dissertation, Northern Arizona University, Flagstaff, AZ.

Haug, E.A., B.A. Milsap, and M.S. Martell. 1993. Burrowing owl (*Speotyto cunicularia*). In *The Birds of North America*, edited by A. Poole and F. Gill. No. 61. Philadelphia: The Birds of North America.

Herder, Michael. 1996. Northern Bat Roost Inventory. Heritage Grant Report No. 196035. Prepared for Arizona Game and Fish Department.

Holechek, J.L. 1981. Livestock Grazing Impacts on Public Lands: A Viewpoint. Journal of Range Management 34(3): 251-254.

Jepsen, S., D.F. Schweitzer, B. Young, N. Sears, M. Ormes, and S.H. Black. 2015. Conservation status and ecology of the Monarch butterfly in the United States. Arlington, VA: NatureServe and Portland, OR: The Xerces Society for Invertebrate Conservation. 28 p.

Johnson, K., L. Wickersham, T. Neville, J. Wickersham, J. Smith, G. Sadoti, and C. Finley. 2012. Habitat Use at Multiple Scales by Pinyon-Juniper Birds on Department of Defense Lands II: Nest and Territory/Colony Scale. Natural Heritage New Mexico Publication 10- GTR-366.

National Drought Mitigation Center. 2015. From "*Understanding Weather Normals*" by Jack Williams, USAToday.com; NDMC "Drought Indices". Accessed at: http://drought.unl.edu/ranchplan/DroughtBasics/WeatherDrought/WhatisNormalPrecipitation.aspx. Accessed April 20, 2015.

Latta, M.J., C.J. Beardmore, and T.E. Corman. 1999. Arizona Partners in Flight Bird Conservation Plan. Version 1.0. Nongame and Endangered Wildlife Program Technical Report 142. Arizona Game and Fish Department, Phoenix, Arizona.

Loeser MR, Sisk TD, Crews TE. Impact of grazing intensity during drought in an Arizona grassland. Conserv Biol. 2007 Feb;21(1):87-97. doi: 10.1111/j.1523-1739.2006.00606.x. PMID: 17298514

Lynn, J.C., C.L. Chambers, and S.S. Rosenstock. 2006. Use of Wildlife Water Developments by Birds in Southwest Arizona During Migration. Wildlife Society Bulletin 34:592-601.

MacCracken, J.G., D.W. Uresk, R.M. Hansen. 1985. Vegetation and Soils of Burrowing Owl Nest Sites in Conata Basin, South Dakota. *The Condor* 87:152-154.

O'Brien, C.S., R.B. Waddell, S.S. Rosenstock, and M.J. Rabe. 2006. Wildlife Use of Water Catchments in Southwest Arizona. *Wildlife Society Bulletin* 34:582-591.

Ockenfels, R.A., C.L. Ticer, A. Alexander, and J.A. Wennerlund. 1996. A landscape-level pronghorn habitat evaluation model for Arizona. Ariz. Game and Fish Dep. Tech. Rep 19, Phoenix. 50pp.

Reynolds, R.T., R.T. Graham, M.H. Reiser, R.L. Bassett, P.L. Kennedy, D.A. Boyce, Jr., G. Goodwin, R. Smith, and E.L. Fisher. 1992. *Management Recommendations for the Northern Goshawk in the Southwestern United States*. General Technical Report RM-217. Fort Collins, Colorado: U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station.

Rosenstock, S.S., W.B. Ballard, and J.C. de Vos, Jr. 1999. Viewpoint: Benefits and Impacts of Wildlife Water Developments. Journal of Range Management 52: 302-311.

Rosenstock, S.S., M.J. Rabe, C.S. O'Brian, and R.B. Waddell. 2004. Studies of Wildlife Water Developments in SW Arizona: wildlife use, water quality, wildlife diseases, wildlife mortalities, and influences of native pollinators. Arizona Game and Fish Dept., Research Branch Technical Guidance number 8, Phoenix, AZ.

Sheley, R. L. 1995. Integrated Rangeland Weed Management. *Rangelands* 17(6): 222-223.

Sprinkle, J., M. Holder, C. Erickson, A. Medina, D. Robinett, G. Ruyle, J/ Maynard, S. Tuttle, J. Hays Jr., W. Meyer, S. Stratton, A. Rogstad, K. Eldredge, J. Harris, L. Howery, W. Sprinkle. 2007. *Dutchman Butte Revisited – Examining Paradigms for Livestock Grazing Exclusion*. Society for Range Management: Vol. 29, No. 6, pp. 21-34.

Stahlecker, D.W, D.G. Mikesic, J.N. White, S. Shaffer, J.P DeLong, M.R. Blakemore, and C.E. Blakemore. 2009. Prey Remains in Nests of Four Corners Golden Eagles, 1998-2008. Western Birds 40:301-306.

Stotz, N.G. and R.P. Balda. 1995. Cache and Recovery Behavior of Wild Pinyon Jays in Northern Arizona. The Southwestern Naturalist, 40:180-184.

Taylor, D.A.R., and M.D. Tuttle. 2012. Water for Wildlife: A Handbook for Ranchers and Range Managers. Bat Conservation International. 20 pp.

U.S. Fish and Wildlife Service. 2021. Birds of Conservation Concern 2021. United State Department of the Interior, U.S. Fish and Wildlife Service, Migratory Birds, Falls Church, Virginia. [Online version available at http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php]

University of Idaho, Rangeland Center. 2011. Rangelands – An Introduction to Wild Open Spaces. Prepared in collaboration with the Idaho Rangeland Resource Commission. Moscow, Idaho. pp. 12.

Watkins, B.E., C. J. Bishop, E. J. Bergman, A. Bronson, B. Hale, B. F. Wakeling, L. H. Carpenter, and D. W. Lutz. 2007. *Habitat Guidelines for Mule Deer: Colorado Plateau Shrubland and Forest Ecoregion.* Mule Deer Working Group, Western Association of Fish and Wildlife Agencies.

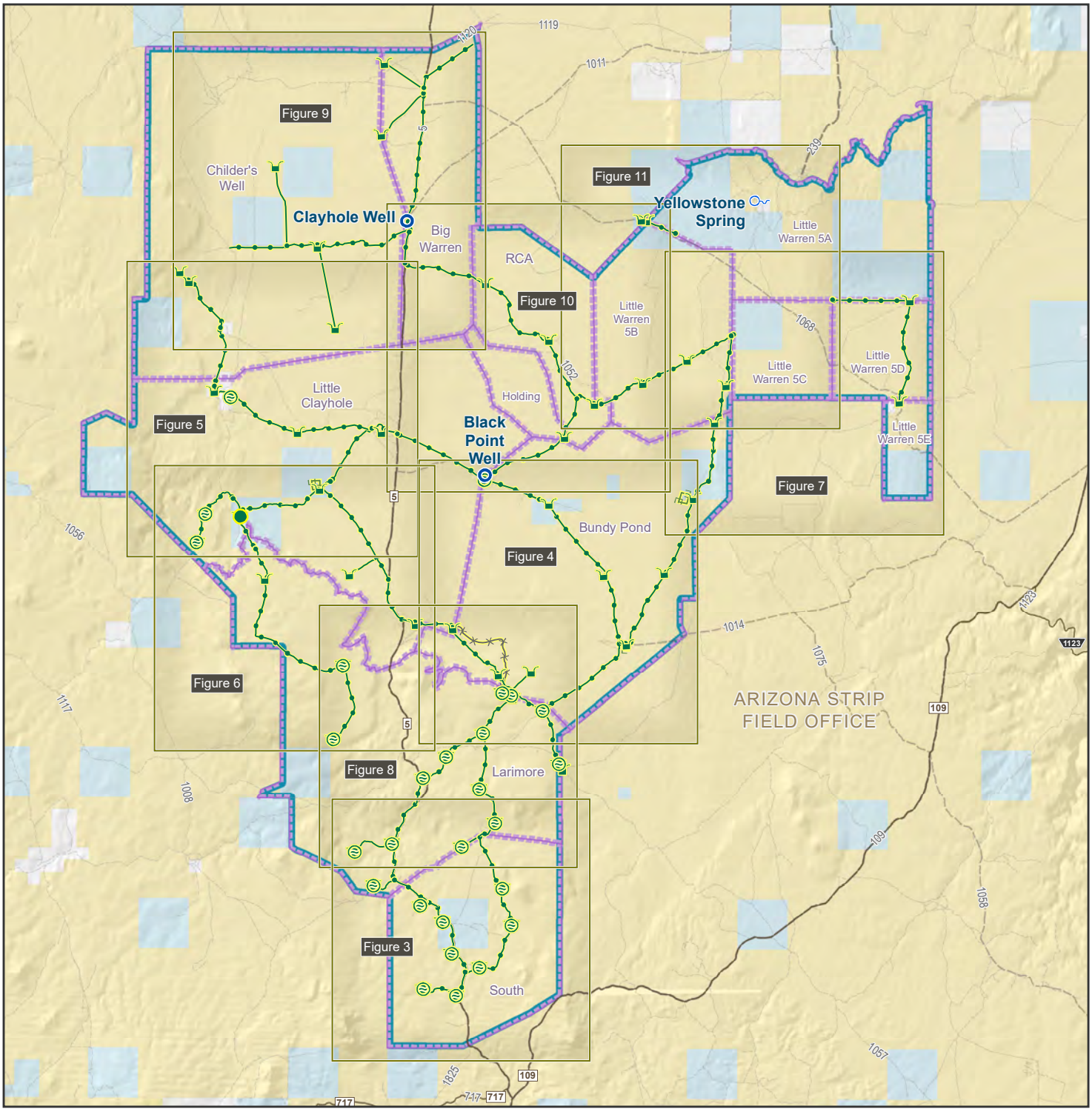
Wiggins, D.A. 2005. Pinyon Jay (*Gymnorhinus cyanocephalus*): a Technical Conservation Assessment. USDA Forest Service, Rocky Mountain Region. 34 pp.

Young, J.A. and C.D. Clements. 2007. Cheatgrass and Grazing Rangelands. Rangelands 29(6):15-20.

Clayhole Allotment Pipeline Installation & Water Developments - Detail Map Figure Index

NEPA Project DOI-BLM-AZ-A010-2020-0008-EA

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Detail Map
Clayhole Allotment
Grazing Pasture

Proposed Range Developments
- Developed Spring (new connection to existing)
- Well (new connection to existing)
- Trough
- Tank
- Pumping Station

Proposed Pipelines and Fences
- Pipeline - Primary
- Pipeline - Spur
- Fence - Exclosure
- Fence - Division

Surface Management Agency
- Bureau of Land Management
- State
- Private

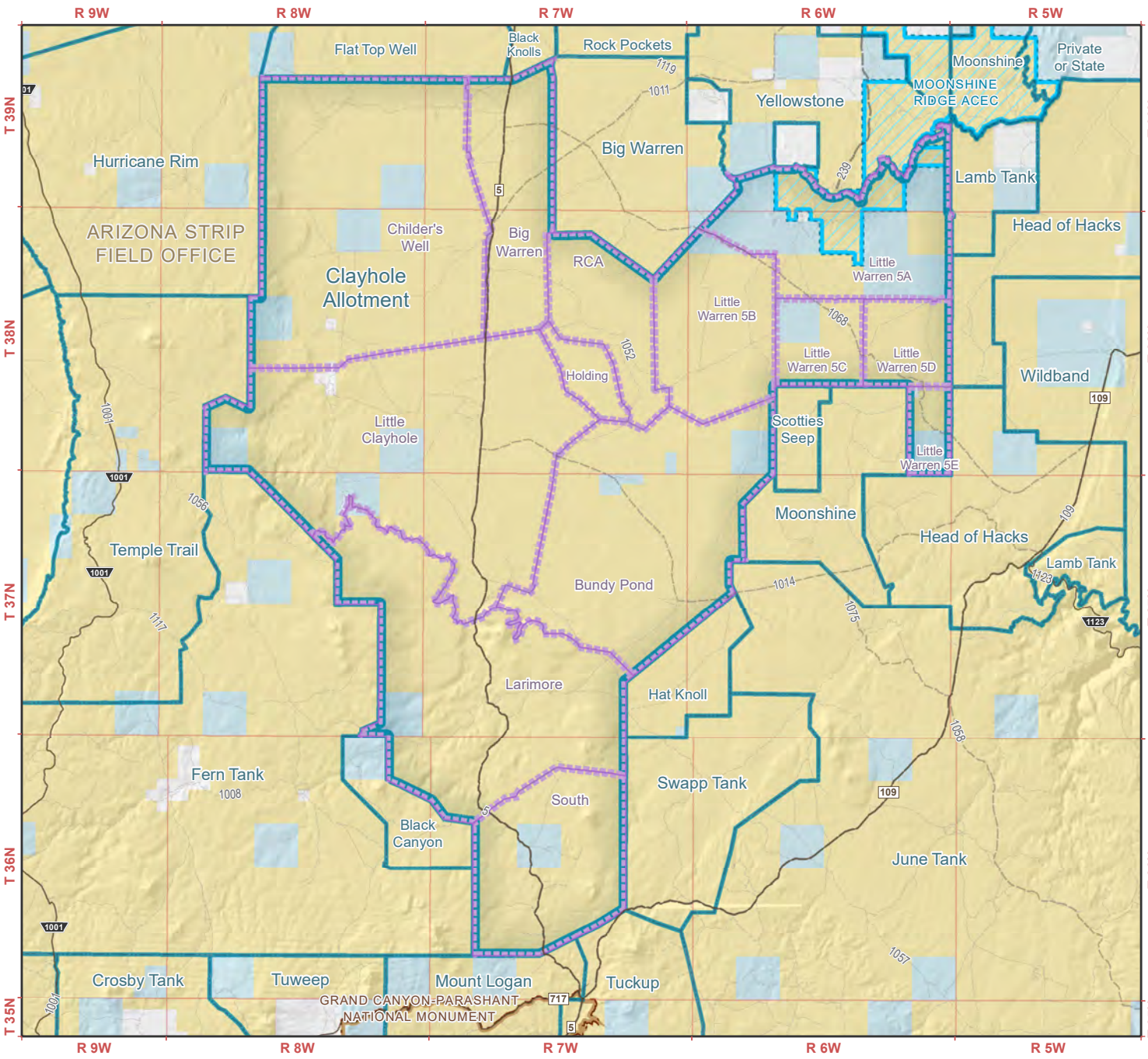
Arizona Strip Routes
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved

0 0.5 1 1.5 2 2.5 3 3.5 4 Miles
0 0.5 1 2 3 4 Kilometers

Map Produced by BLM Arizona Strip District
File: Clayhole_Pipeline_Detail_Index_2020.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 1:180,000 at 8.5x11 page output
Date: 8/28/2020

N

Figure 1 - Clayhole Allotment and Pastures Overview Map
NEPA Project DOI-BLM-AZ-A010-2020-0008-EA
Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Grazing Allotment
Grazing Pasture
Area of Critical Environmental Concern (ACEC)
BLM National Monument

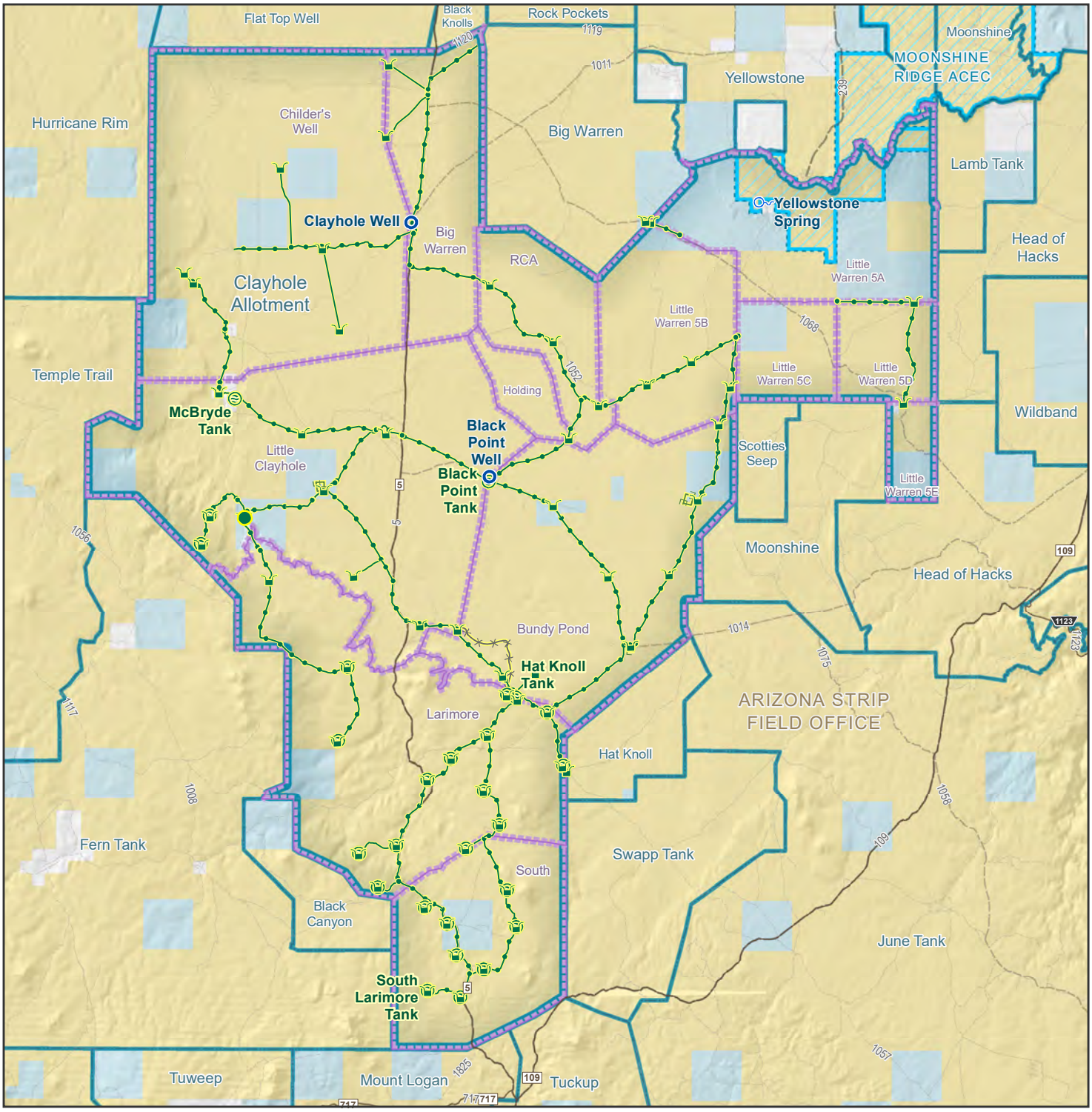
Surface Management Agency
Bureau of Land Management
State
Private
PLSS Township

Arizona Strip Routes
Primary Road Unpaved
Secondary Road Unpaved
Tertiary Road Unpaved

0 1 2 3 4 5 10 Miles
0 1 2 3 4 5 10 Kilometers

Map Produced by BLM Arizona Strip District
File: Clayhole_Pipeline_Overview_Current_2020.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 1:215,000 at 8.5x11 page output
Date: 8/28/2020

Figure 2 - Clayhole Allotment Pipeline Installation & Water Developments Overview Map
NEPA Project DOI-BLM-AZ-A010-2020-0008-EA
Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Proposed Range Developments
- Developed Spring (new connection to existing)
- Well (new connection to existing)
- Trough
- Storage Tank
- Pumping Station

Proposed Pipelines and Fences
- Pipeline - Primary
- Pipeline - Spur
- Fence - Exclosure
- Fence - Division

- Grazing Allotment
- Grazing Pasture

Surface Management Agency
- Bureau of Land Management
- State
- Private
- Area of Critical Environmental Concern (ACEC)

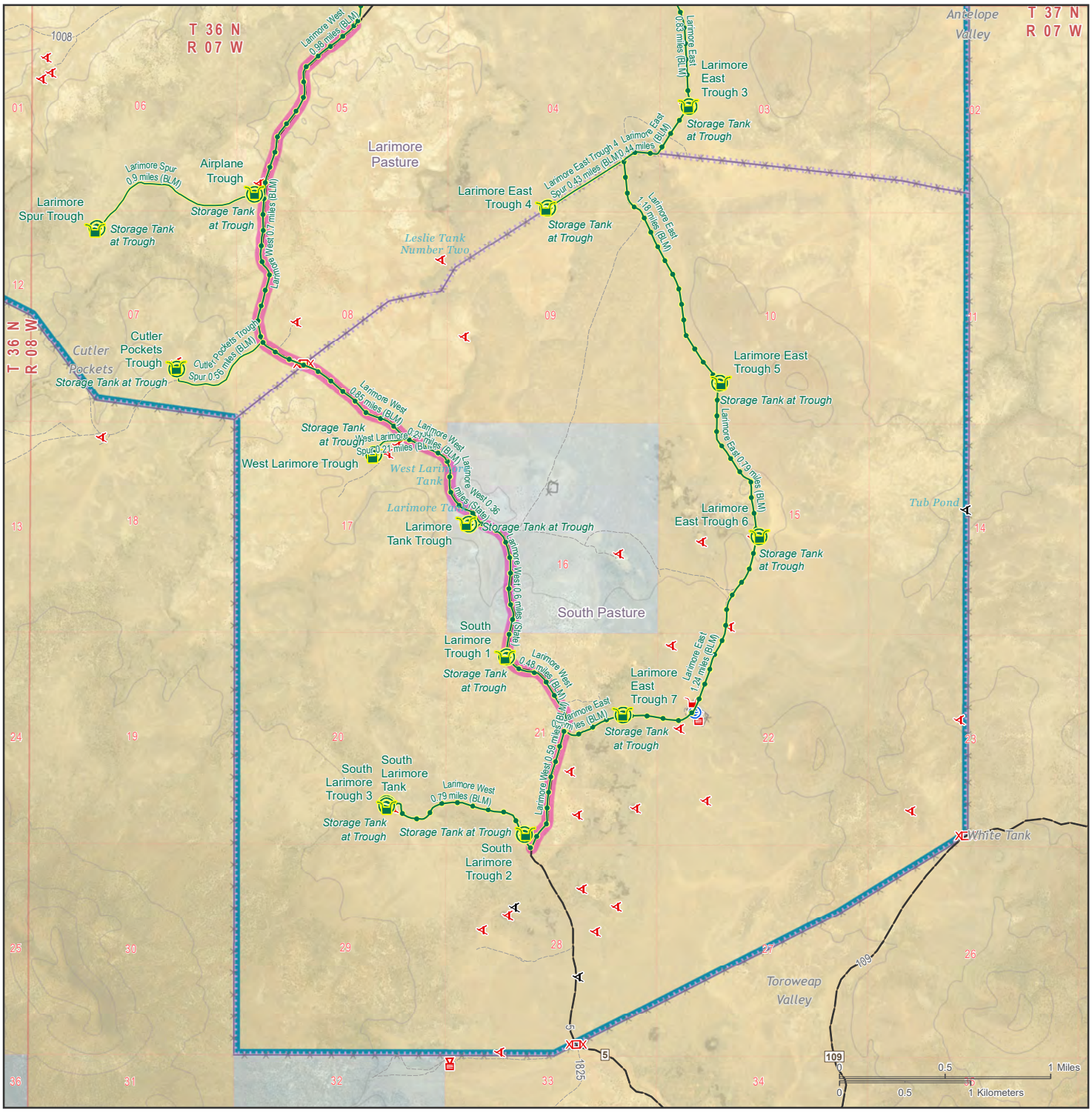
Arizona Strip Routes
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved

0 0.5 1 1.5 2 2.5 3 3.5 4 Miles
0 0.5 1 2 3 4 Kilometers

Map Produced by BLM Arizona Strip District
File: Clayhole_Pipeline_Overview_Proposed_2020.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 1:180,000 at 8.5x11 page output
Date: 8/28/2020

N

Figure 3 - South Pasture: South Larimore Pipeline, Tank, and Trough Locations
NEPA Project DOI-BLM-AZ-A010-2020-0008-EA
Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Proposed Range Developments
- Trough
- Tank

Proposed Pipelines and Fences
- Pipeline - Primary
- Pipeline - Spur

- Clayhole Allotment
- Grazing Pasture
- Existing Authorized Use within Proposed Pipelines - CR 5 ROW

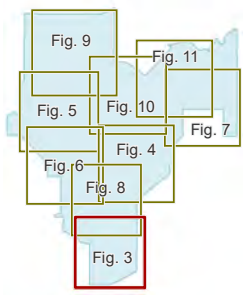
Existing Range Development Lines within Clayhole Allotment
- Fence
- Pipeline

Existing Range Development Points within Clayhole Allotment
- Fenced Detention Reservoir
- Unfenced Detention Reservoir
- Catchments
- Storage Tank
- Trough
- Cattleguard

Surface Management Agency
- Bureau of Land Management
- State

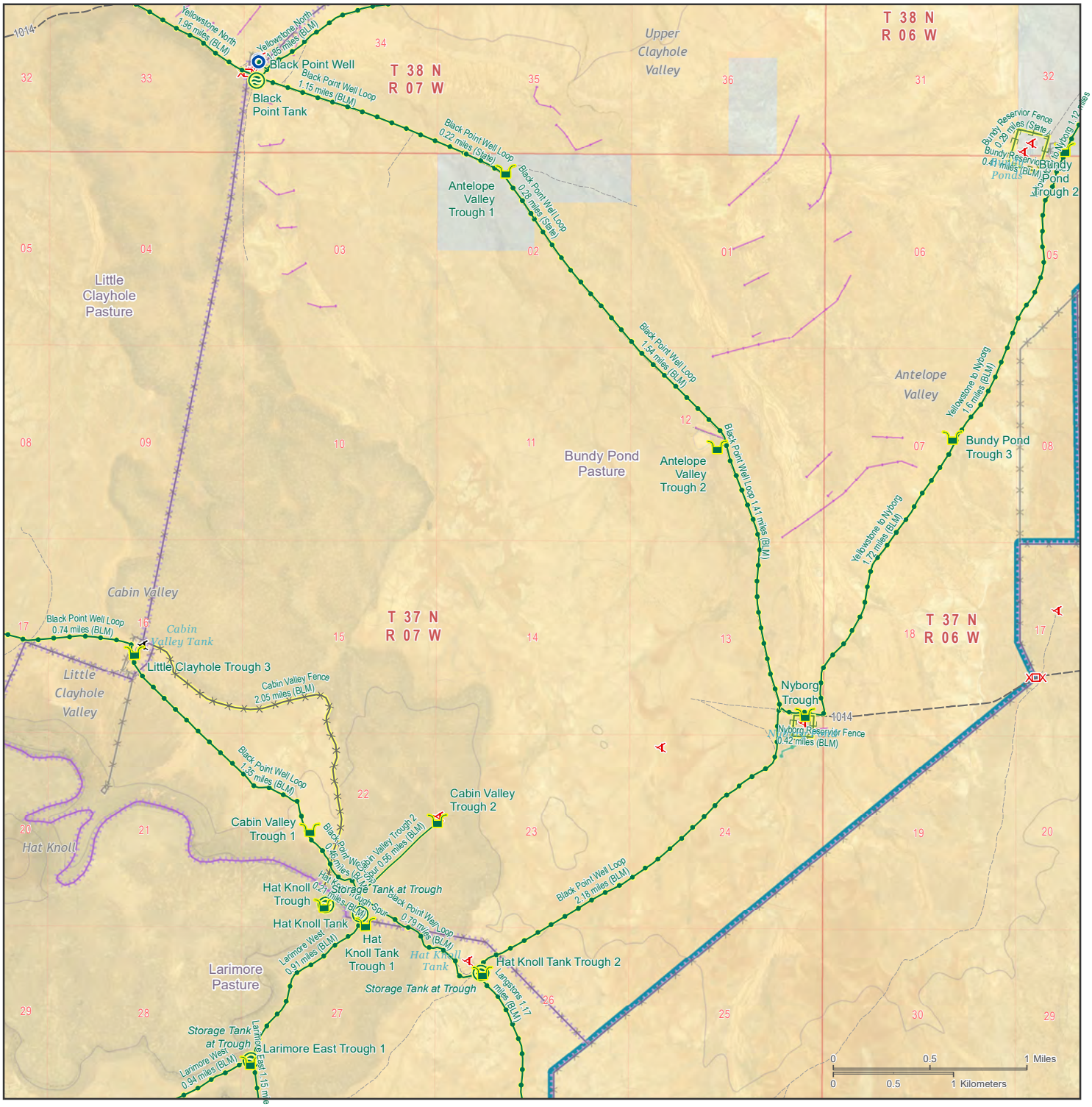
- PLSS Township
- PLSS Section

Arizona Strip Routes
- Primary Road Unpaved
- Tertiary Road Unpaved



Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 142,700 at 8.5x11 page output

Figure 4 - Bundy Pond: Hat Knoll and Black Point Tank Locations
NEPA Project DOI-BLM-AZ-A010-2020-0008-EA
Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Proposed Range Developments
- Well (new connection to existing)
- Trough
- Tank

Proposed Pipelines and Fences
- Pipeline - Primary
- Pipeline - Spur
- Fence - Exclosure
- Fence - Division

- Clayhole Allotment
- Grazing Pasture

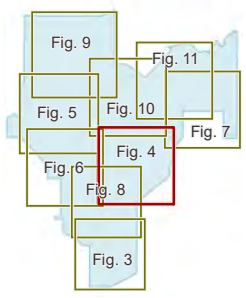
Existing Range Development Lines within Clayhole Allotment
- Fence
- Pipeline
- Dikes and Diversions

Existing Range Development Points within Clayhole Allotment
- Fenced Detention Reservoir
- Unfenced Detention Reservoir
- Well
- Cattleguard

Surface Management Agency
- Bureau of Land Management
- State

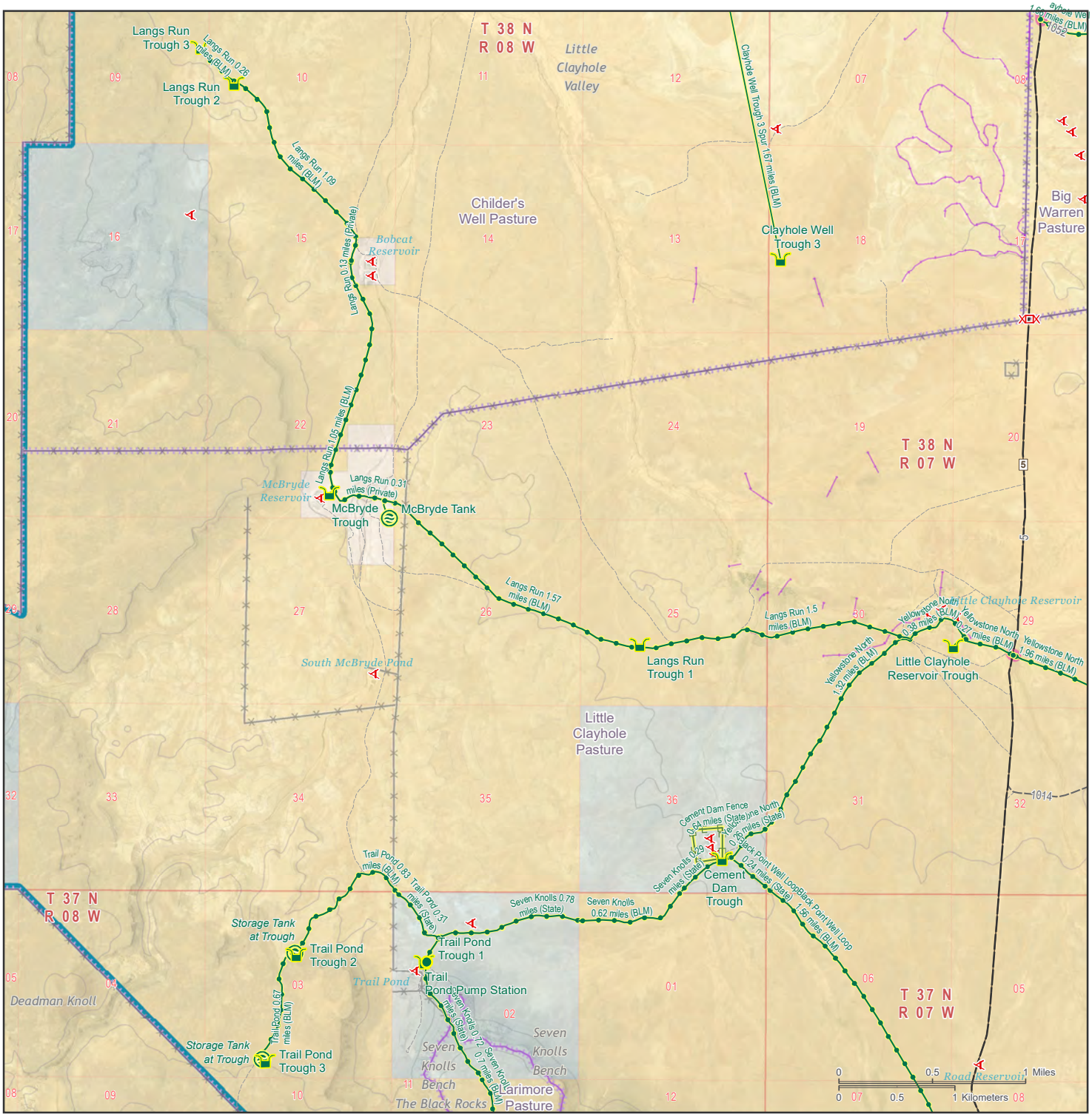
- PLSS Township
- PLSS Section

Arizona Strip Routes
- Secondary Road Unpaved
- Tertiary Road Unpaved



Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 146,200 at 8.5x11 page output

Figure 5 - Little Clayhole: McBryde and Trail Pond Tank Locations
NEPA Project DOI-BLM-AZ-A010-2020-0008-EA
Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Proposed Range Developments
- Trough
- Tank
- Pumping Station

Proposed Pipelines and Fences
- Pipeline - Primary
- Pipeline - Spur
- Fence - Exclosure

- Clayhole Allotment
- Grazing Pasture
- Existing Authorized Use within Proposed Pipelines - CR 5 ROW

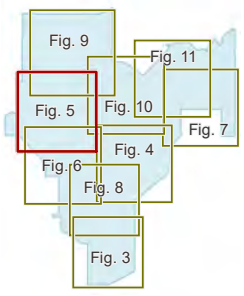
Existing Range Development Lines within Clayhole Allotment
- Fence
- Dikes and Diversions

Existing Range Development Points within Clayhole Allotment
- Unfenced Detention Reservoir
- Cattleguard

Surface Management Agency
- Bureau of Land Management
- State
- Private

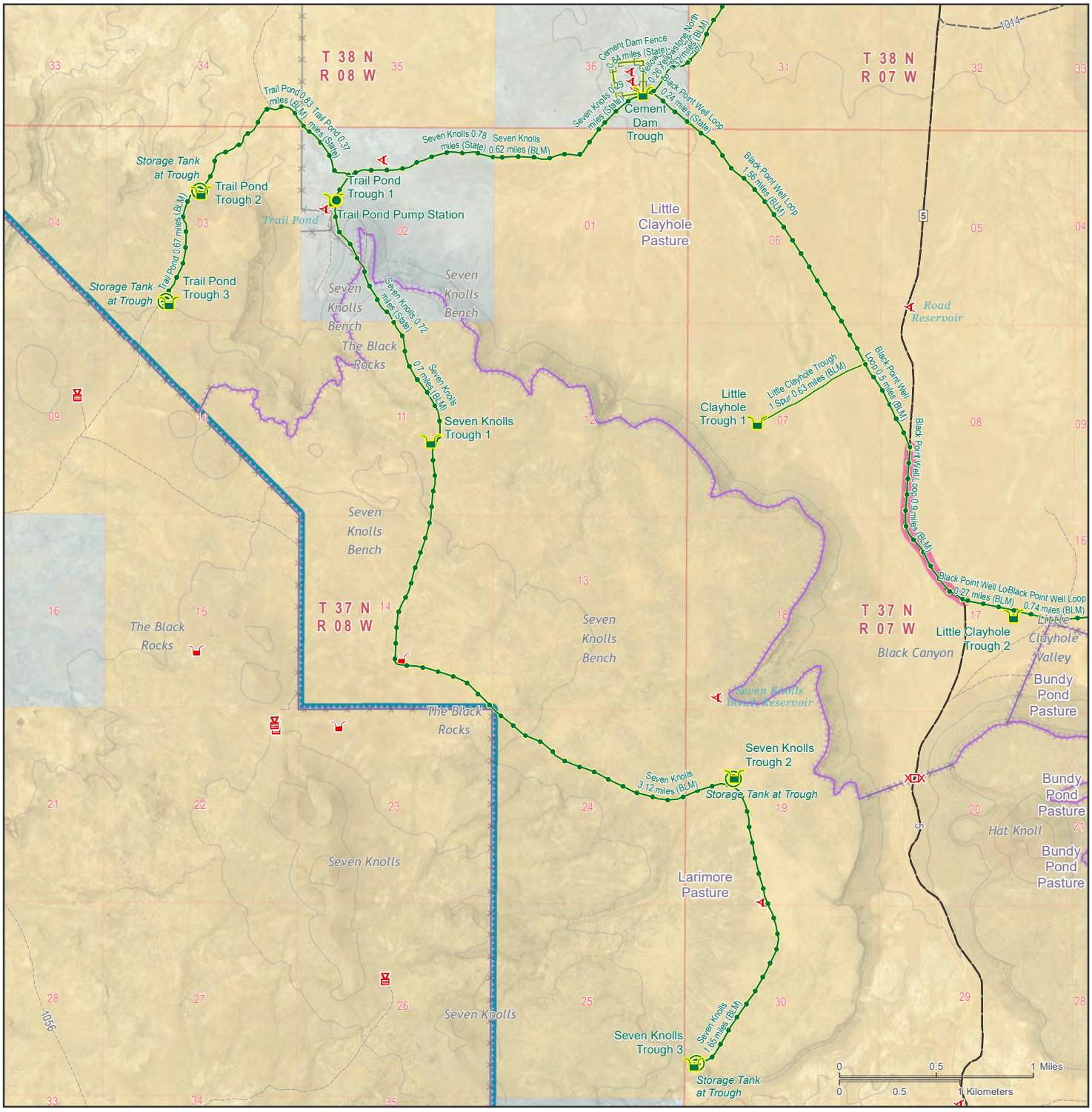
- PLSS Township
- PLSS Section

Arizona Strip Routes
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved



Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 1:48,200 at 8.5x11 page output

Figure 6 - Little Clayhole and Larimore Pastures, Pump Station and 10,000 gal Water Tanks
NEPA Project DOI-BLM-AZ-A010-2020-0008-EA
Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Proposed Range Developments
- Trough
- Tank
- Pumping Station

Proposed Pipelines and Fences
- Pipeline - Primary
- Pipeline - Spur
- Fence - Exclosure

- Clayhole Allotment
- Grazing Pasture
- Existing Authorized Use within Proposed Pipelines - CR 5 ROW

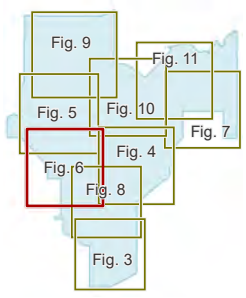
Existing Range Development Lines within Clayhole Allotment
- Fence

Existing Range Development Points within Clayhole Allotment
- Unfenced Detention Reservoir
- Catchments
- Trough
- Cattleguard

Surface Management Agency
- Bureau of Land Management
- State

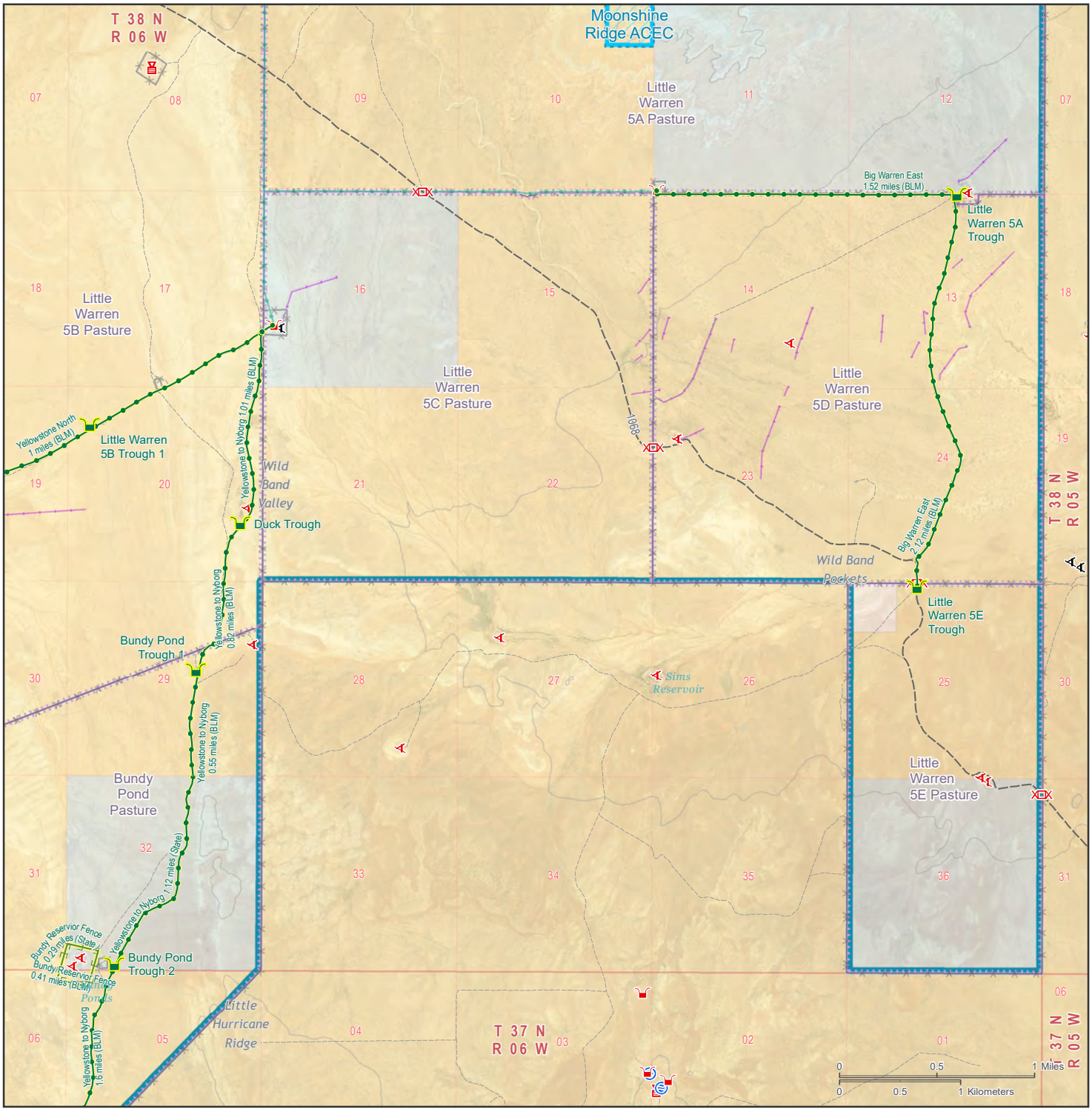
- PLSS Township
- PLSS Section

Arizona Strip Routes
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved



Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 1:46,500 at 8.5x11 page output

Figure 7 - Little Warren East: Bundy Pond Reservoir Fencing
NEPA Project DOI-BLM-AZ-A010-2020-0008-EA
Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Proposed Range Developments
- Trough

Proposed Pipelines and Fences
- Pipeline - Primary
- Pipeline - Spur
- Fence - Exclosure

- Clayhole Allotment
- Grazing Pasture

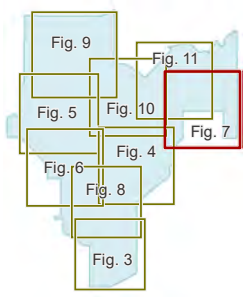
Existing Range Development Lines within Clayhole Allotment
- Fence
- Pipeline
- Dikes and Diversions

Existing Range Development Points within Clayhole Allotment
- Fenced Detention Reservoir
- Unfenced Detention Reservoir
- Catchments
- Storage Tank
- Trough
- Cattleguard

Surface Management Agency
- Bureau of Land Management
- State
- Private

- PLSS Township
- PLSS Section
- Area of Critical Environmental Concern (ACEC)

Arizona Strip Routes
- Secondary Road Unpaved
- Tertiary Road Unpaved



Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 1:46,200 at 8.5x11 page output

Figure 8 - Larimore: Pipeline, Troughs, Tanks, and Fencing
NEPA Project DOI-BLM-AZ-A010-2020-0008-EA
Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office

Proposed Range Developments
- Trough
- Tank

Proposed Pipelines and Fences
- Pipeline - Primary
- Pipeline - Spur
- Fence - Division

- Clayhole Allotment
- Grazing Pasture
- Existing Authorized Use within Proposed Pipelines - CR 5 ROW

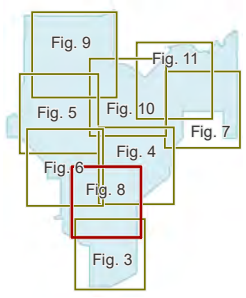
Existing Range Development Lines within Clayhole Allotment
- Fence

Existing Range Development Points within Clayhole Allotment
- Fenced Detention Reservoir
- Unfenced Detention Reservoir
- Catchments
- Cattleguard

Surface Management Agency
- Bureau of Land Management
- State

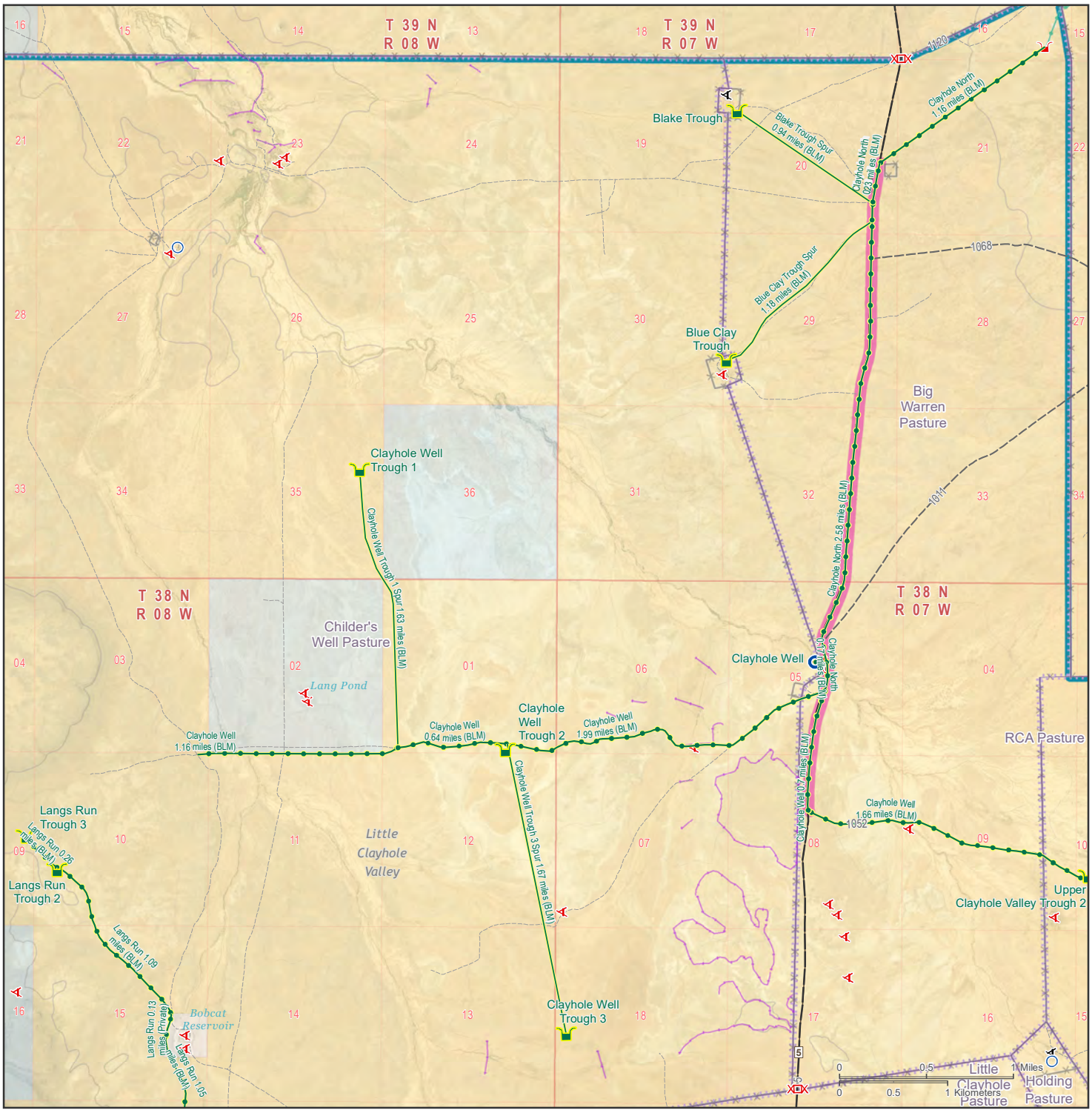
- PLSS Township
- PLSS Section

Arizona Strip Routes
- Primary Road Unpaved
- Tertiary Road Unpaved



Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 142,700 at 8.5x11 page output

Figure 9 - Childer's Well: Pipeline and Troughs
NEPA Project DOI-BLM-AZ-A010-2020-0008-EA
Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Proposed Range Developments
- Well (new connection to existing)
- Trough

Proposed Pipelines and Fences
- Pipeline - Primary
- Pipeline - Spur

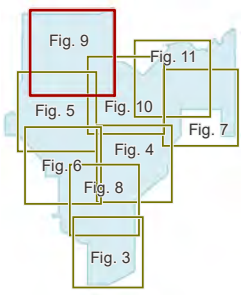
- Clayhole Allotment
- Grazing Pasture
- Existing Authorized Use within Proposed Pipelines - CR 5 ROW

Existing Range Development Lines within Clayhole Allotment
- Fence
- Pipeline
- Dikes and Diversions

Existing Range Development Points within Clayhole Allotment
- Fenced Detention Reservoir
- Unfenced Detention Reservoir
- Well
- Trough
- Cattleguard

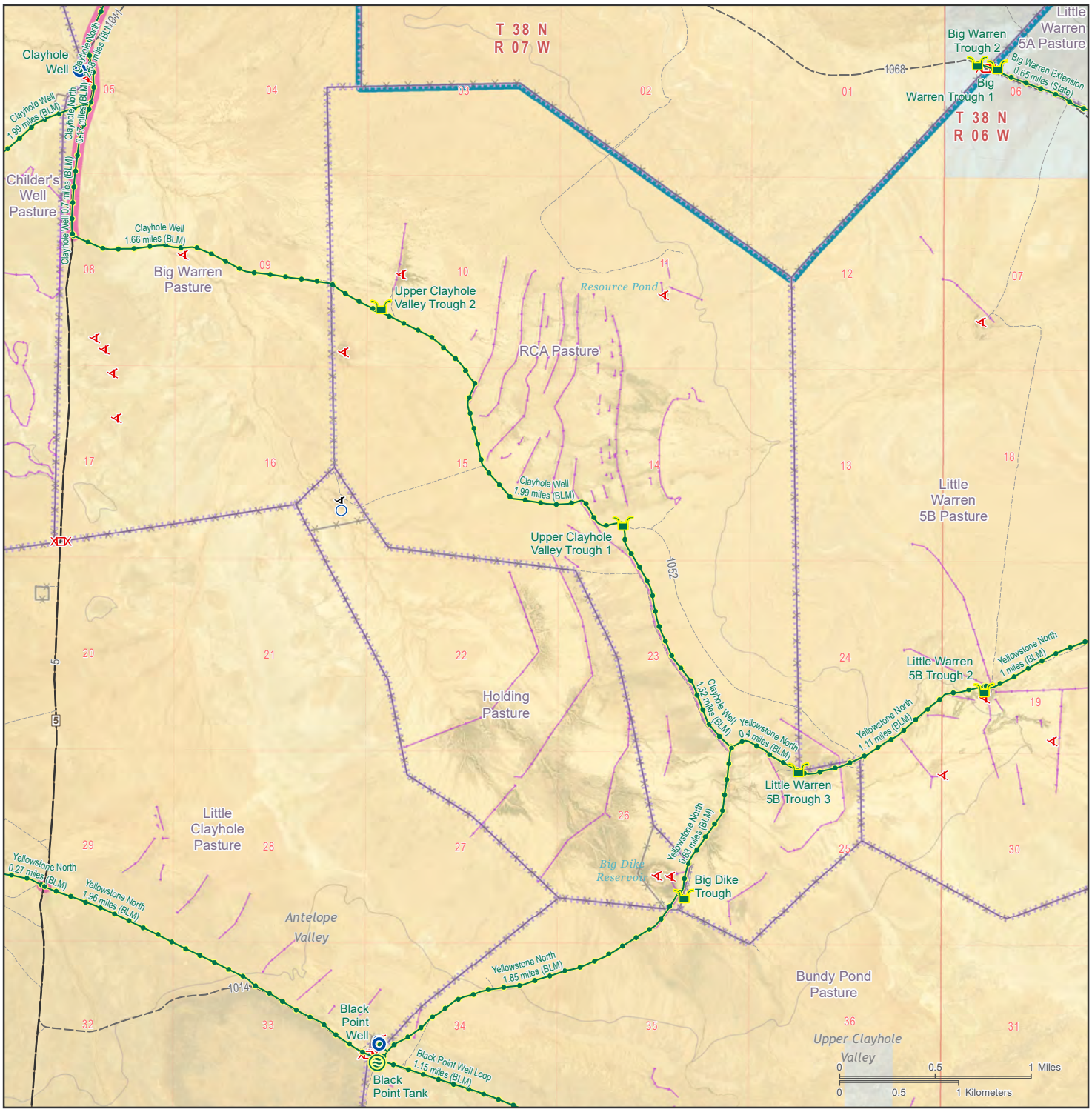
Surface Management Agency
- Bureau of Land Management
- State
- Private
- PLSS Township
- PLSS Section

Arizona Strip Routes
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved



Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 1:51,800 at 8.5x11 page output

Figure 10 - Upper Clayhole: Bundy Pond Pasture and Black Point Tank
NEPA Project DOI-BLM-AZ-A010-2020-0008-EA
Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Proposed Range Developments
- Well (new connection to existing)
- Trough
- Tank

Proposed Pipelines and Fences
- Pipeline - Primary
- Pipeline - Spur

- Clayhole Allotment
- Grazing Pasture
- Existing Authorized Use within Proposed Pipelines - CR 5 ROW

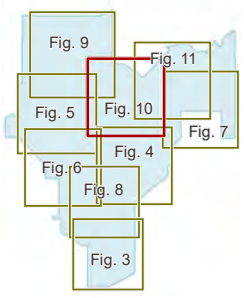
Existing Range Development Lines within Clayhole Allotment
- Fence
- Dikes and Diversions

Existing Range Development Points within Clayhole Allotment
- Fenced Detention Reservoir
- Unfenced Detention Reservoir
- Well
- Cattleguard

Surface Management Agency
- Bureau of Land Management
- State

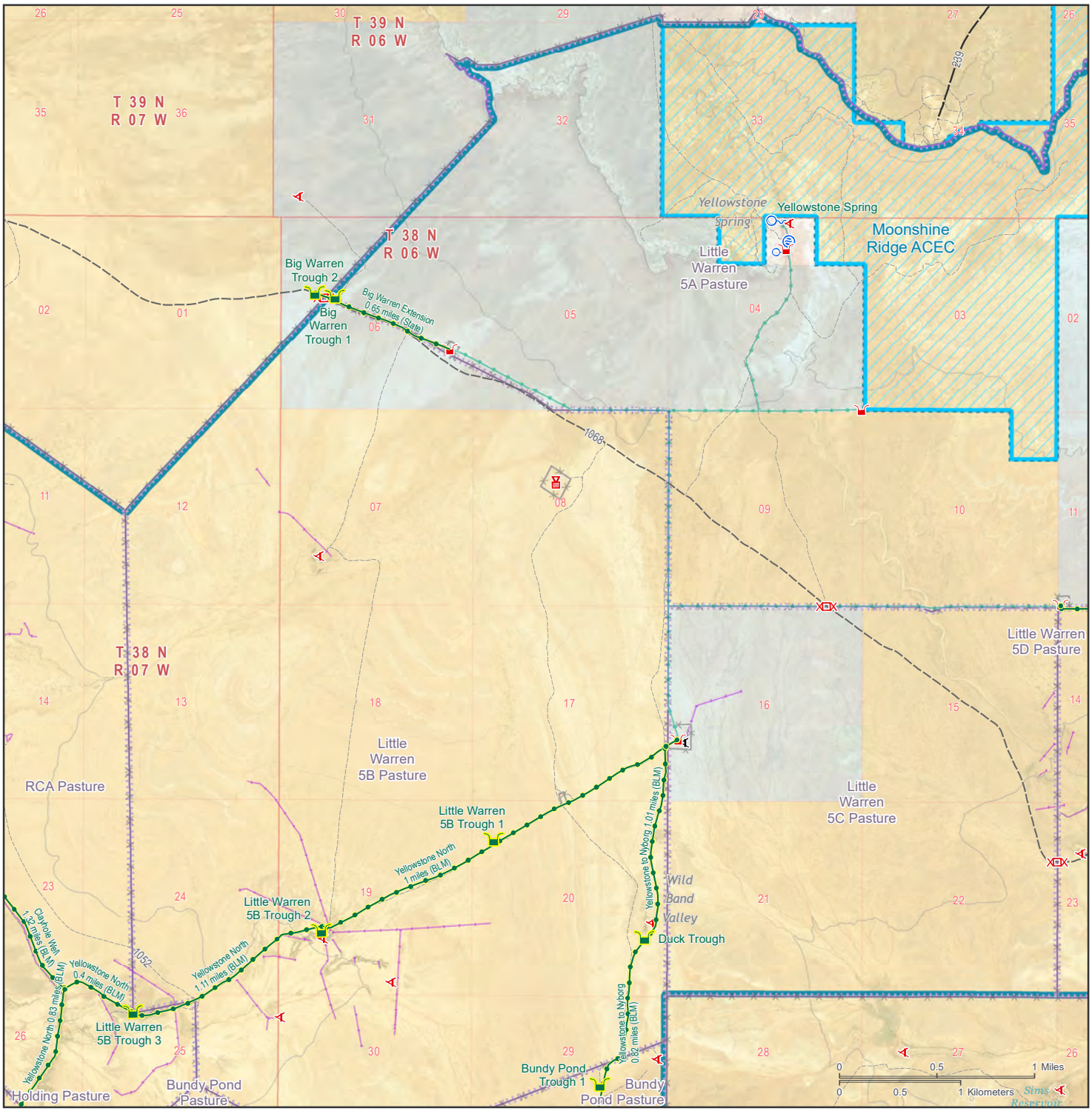
- PLSS Township
- PLSS Section

Arizona Strip Routes
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved



Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 1:47,000 at 8.5x11 page output

Figure 11 - Little Warren West: McBryde Tank
NEPA Project DOI-BLM-AZ-A010-2020-0008-EA
Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Proposed Range Developments
- Developed Spring (new connection to existing)
- Trough

Proposed Pipelines and Fences
- Pipeline - Primary
- Pipeline - Spur

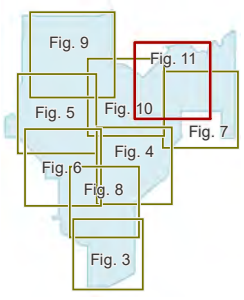
- Clayhole Allotment
- Grazing Pasture

Existing Range Development Lines within Clayhole Allotment
- Fence
- Pipeline
- Dikes and Diversions

Existing Range Development Points within Clayhole Allotment
- Fenced Detention Reservoir
- Unfenced Detention Reservoir
- Catchments
- Spring
- Storage Tank
- Trough
- Cattleguard

Surface Management Agency
- Bureau of Land Management
- State
- Private
- PLSS Township
- PLSS Section
- Area of Critical Environmental Concern (ACEC)

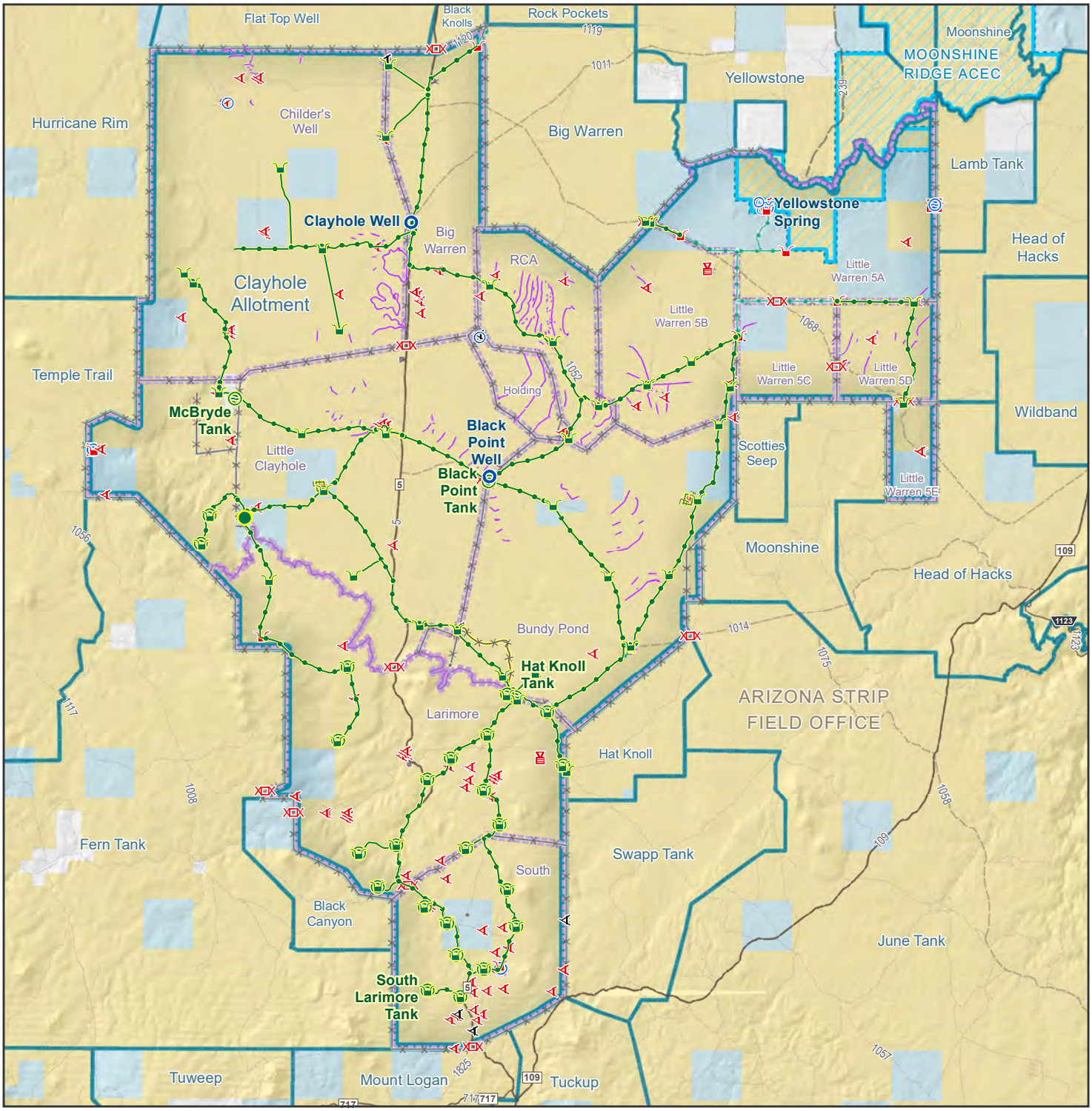
Arizona Strip Routes
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved



Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 1:46,200 at 8.5x11 page output

Figure 12 - Clayhole Allotment Pipeline Installation & Water Developments Overview Map
Existing and Proposed Range Developments | NEPA Project DOI-BLM-AZ-A010-2020-0008-EA

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office



Proposed Range Developments
- Developed Spring (new connection to existing)
- Well (new connection to existing)
- Trough
- Storage Tank
- Pumping Station

Proposed Pipelines and Fences
- Pipeline - Primary
- Pipeline - Spur
- Fence - Exclosure
- Fence - Division

Existing Range Development Points within Clayhole Allotment
- Fenced Detention Reservoir
- Unfenced Detention Reservoir
- Catchments
- Spring
- Well
- Storage Tank
- Trough
- Cattleguard

Existing Range Development Lines within Clayhole Allotment
- Fence
- Pipeline
- Dikes and Diversions

- Grazing Allotment
- Grazing Pasture

Surface Management
- Bureau of Land Management
- State
- Private
- Area of Critical Environmental Concern (ACEC)

Arizona Strip Routes
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved

0 0.5 1 1.5 2 2.5 3 3.5 4 Miles
0 0.5 1 2 3 4 Kilometers

Map Produced by BLM Arizona Strip District
File: Clayhole_Pipeline_Overview_Proposed_Existing_2020.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 1:180,000 at 8.5x11 page output
Date: 8/28/2020

APPENDIX B – Public Comments Received

A 30-day scoping period for this EA was provided from January 14-February 14, 2021. Scoping comments received are shown in Table B-1 (below), along with a response to the comment; comments that were not considered substantive (e.g., opinions or preferences) did not receive a formal response but were considered in the decision-making process.

Table B-1. Scoping Comments and Responses

Comment No. / Commenter	Comment	Response
Comment #SC-1 Jeff Burgess	Your scoping letter fails to mention how much this massive, proposed livestock water project would cost. It will obviously be expensive. The allotment's permittee, the Heaton Cattle Co., LLC, has already received at least $482,488 in USDA Environmental Quality Incentives Program (EQIP) assistance. I suspect the taxpayers will get stuck help paying for this proposed project too.	Funds are currently not allocated for this project. If the proposed project is approved, implementation would be the responsibility of the grazing permittee. Additional funding may be provided by the Natural Resources Conservation Service, Arizona Strip Grazing Board, Arizona Game & Fish Dept., and potentially the BLM, since public land resources would benefit from the installation of new waters, as described in Chapter 4 of this EA. Labor is typically provided by grazing permittees as part of the cost sharing agreement. This information is included in Section 2.2.
Comment #SC-2 Jeff Burgess	Furthermore, the Southwest is in the midst of a severe, long-term drought that shows no sign of ending in the near future. The BLM should be responding to the situation by reducing permitted livestock numbers to protect natural resources, not authorizing new livestock waters that allow permittees to keep their cattle on the land despite a severe drought that's likely to continue due to climate change.	The BLM is not proposing to increase or decrease the total number of AUMs for the Clayhole Allotment, nor does the proposed project affect the BLM's ability to work with the permittee to adjust livestock numbers in situations such as drought. During drought years, the number of cattle grazed on the allotment are reduced to prevent them from adversely affecting vegetation. An alternative to reduce livestock numbers was added to Chapter 2 of the EA (see Section 2.4.2 – Alternatives Considered but Eliminated from Detailed Analysis). It was determined that this alternative is outside the scope of the EA as it would not respond to the purpose and need for action, and is therefore not appropriate for analysis in this EA. Livestock grazing will be evaluated and addressed during the permit renewal process for the Clayhole Allotment. The proposed project is within a grazing allotment that is available for livestock use within the Arizona Strip Field Office RMP, and that has 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

Comment No. / Commenter	Comment	Response
		would be addressed during the permit renewal process, when a variety of information (including the land health evaluation and allotment monitoring data) 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.
Comment #SC-3 Gavin Bieber	I am scratching my head at this plan to install 92 miles of new pipeline and multiple large storage tanks. Perhaps the need for such extensive water developments should be a hint that the area doesn't have the water resources to support livestock?	As described in Section 1.2 of this EA, the proposed action is designed to provide reliable water sources throughout the allotment for both livestock and wildlife. Because most of the existing reservoirs within the allotment are unreliable due to their inability to retain water, there is a need for better water distribution. The proposed pipeline would use currently developed water sources and provide reliable water to all pastures of the allotment. The current water distribution makes it difficult for the permittee and the BLM to best plan and adhere to the grazing system contained within the AMP. 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. The proposed action would therefore result in a more uniform utilization of forage, which would aid in maintaining and improving the desired plant community objectives. The uniformity in livestock distribution would enhance rangeland vegetation by accelerating plant succession while increasing plant diversity and vigor.
Comment #SC-4 Gavin Bieber	I would urge you to strongly consider a No Action alternative in this case. I would encourage you to investigate long-term trends for this allotment including rangeland health, rainfall/drought trends, and climate change when weighing your decision.	The No Action alternative is included in the EA analysis (see Sections 2.3, 4.2.1.2 and 4.2.2.2). The information you request be considered is data that is used in determining whether an allotment is meeting land health standards. As stated in Section 3.4.1.1, the land health evaluation process (including considering more recent monitoring data) determined that the allotment is making significant progress toward meeting standards for rangeland health. As stated above in the response to Comment No. SC-2, land health on the allotment is one of the considerations used by the BLM during the permit renewal process.

Comment No. / Commenter	Comment	Response
Comment #SC-5 Gavin Bieber	If there isn't enough rainfall to water your cattle in an area, then how can there be enough rainfall to adequately provide forage for the cattle?	See response to Comment Nos. SC-2 and SC-3.
Comment #SC-6 Cyndi Tuell, Western Watersheds Project	What are the impacts of the proposed project on the desert tortoise?	The proposed project is not in desert tortoise habitat.
Comment #SC-7 Cyndi Tuell, Western Watersheds Project	What wildlife will benefit from this project other than huntable wildlife?	Refer to section 4.2.3 of the EA for a list of wildlife (including non-game species) and anticipated effects as a result of the proposed action. 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 species (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).
Comment #SC-8 Cyndi Tuell, Western Watersheds Project	How will the livestock grazing supported by the water development harm the wildlife this water development is supposedly going to benefit?	The proposed project area is within a grazing allotment that is available for livestock use within the Arizona Strip Field Office RMP, and that has 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 current proposed action would not change the amount of livestock authorized on the Clayhole Allotment. Potential impacts to resources (including wildlife) from livestock grazing would be addressed during the permit renewal process, when a variety of information (including the land health evaluation and allotment monitoring data) is considered and evaluated. In addition, AGFD has been notified of the proposed

Comment No. / Commenter	Comment	Response
		project and has not expressed concerns about impacts to wildlife – other than potential benefits from increased reliable water sources.
Comment #SC-9 Cyndi Tuell, Western Watersheds Project	How will the reservoirs that include fencing benefit wildlife and which wildlife specifically? Will the fencing do more harm to wildlife than the water development will benefit them?	Constructing fences around the reservoirs would assist the grazing permittee in controlling grazing intensity within the pasture the reservoirs are located. Cattle could be restricted from accessing the reservoir and moved to other troughs located within the pasture near less utilized areas. The proposed action would therefore result in a more uniform utilization of forage, which would aid in maintaining and improving the desired plant community objectives and benefit wildlife by improving habitat use by mule deer, pronghorn, and other area species (see response to Comment No. SC-7), which are objectives contained within the Arizona Strip Field Office RMP. The proposed fencing would be designed to meet AGFD and BLM wildlife specifications (i.e., the bottom strand would consist of twisted barbless wire) in order to facilitate safe passage of mule deer, pronghorn and other wildlife species. These wildlife-friendly fences allow passage underneath, through, and over the fence and would ensure access to fenced reservoirs by wildlife.
Comment #SC-10 Cyndi Tuell, Western Watersheds Project	The scoping notice makes clear that current water distribution is not adequate for current livestock use. In light of this admission that the allotment is not suitable for livestock, the BLM must disclose how current livestock use without adequate water distribution has harmed the natural resources on the allotment.	The scoping notice states, "These current water sources do not provide adequate water distribution throughout the allotment. The proposed action would utilize the available and reliable water sources and distribute, via the proposed action, throughout the allotment." The scoping notice does not state that the allotment is not suitable for livestock.
Comment #SC-11 Cyndi Tuell, Western Watersheds Project	What is the source of funds for this project?	See response to Comment No. SC-1.
Comment #SC-12	It seems these lands are unsuitable for livestock grazing given how arid they are and the soil's inability to hold water in existing stock tanks. Please explain why the BLM is choosing to continue livestock	See response to Comment Nos. SC-1, SC-2, SC-3, and SC-10.

Comment No. / Commenter	Comment	Response
Cyndi Tuell, Western Watersheds Project	grazing on this allotment at great public expense, including the damage to federally managed public lands in addition to the costs related to propping up livestock grazing infrastructure for a private corporation, the Heaton Cattle, Company.	
Comment #SC-13 Cyndi Tuell, Western Watersheds Project	Why is the public being asked to bear the costs of this private business operation?	See response to Comment No. SC-1.
Comment #SC-14 Cyndi Tuell, Western Watersheds Project	How much money has the permittee received for livestock infrastructure in the past 10 years for this or any other allotments managed by the BLM? This information is relevant because the public has a right to know how much it actually costs to support livestock grazing on federally managed public lands. For example, if this permittee has received over $400,000 in federal funds over a ten year period to manage livestock grazing, that averages out to $40,000 per year gifted to a corporation for the privilege of harming federal public lands for their corporate profit. WWP would like to have a better understanding of exactly how federal much money this particular permittee has received for this particular allotment for livestock and we would also like an explanation as to why any further federal funding should be provided to this permittee for this particular allotment.	See response to Comment No. SC-1.
Comment #SC-15 Cyndi Tuell, Western Watersheds Project	What are the impacts of this project on all other wildlife? For example, wildlife are directly negatively impacted by water developments from crushing and displacement during construction, and drowning after the tanks are filled. Wildlife are indirectly impacted when people leave trash at the water developments or use tanks as target shooting backdrops. Please disclose any and all anticipated impacts.	Refer to Section 2.2.1 of this EA for best management practices to be implemented to reduce or eliminate impacts on wildlife resources. See Section 3.4.3 of the EA for a list of wildlife anticipated to occur in the project area, and Section 4.2.3 for potential effects to these species as a result of the proposed action. See also response to Comment Nos. SC-7, SC-8, and SC-9.

Comment No. / Commenter	Comment	Response
Comment #SC-16 Cyndi Tuell, Western Watersheds Project	How will this project impact visual resources on the allotment?	The proposed action includes Best Management Practices (Section 2.2.1) that describe how new tanks and troughs would be masked from the casual observer to meet VRM objectives. Anticipated effects to visual resources are discussed in Table 3.2 of this EA.
Comment #SC-17 Cyndi Tuell, Western Watersheds Project	What is the current categorization of this allotment? (Maintain, improve, at risk?)	The Clayhole Allotment is categorized as a Management Status "improve" (I) allotment as described in the Arizona Strip Field Office RMP (BLM 2008a). Any one of the categorization criteria (found on page C-4 of the RMP) may identify the allotment as an "I" allotment and does not necessarily mean that allotment conditions are universally unsatisfactory.
Comment # SC-18 Cyndi Tuell, Western Watersheds Project	How often will the pipeline require repair or replacement?	As stated in Section 2.2 of the EA, the exact maintenance requirements for the pipeline are not known but are expected to include annual inspections and replacing or patching material when repairs are needed, and annual inspections, which may include digging to find and repair leaks or clogs in the pipe. The life of the project is expected to be at least 20-50 years, meaning no replacement is anticipated during that timeframe.
Comment #SC-19 Cyndi Tuell, Western Watersheds Project	What is the cost of repairing or replacing the pipeline?	Repair or replacement costs would vary depending on the nature and extent of work necessary to repair the pipeline.
Comment #SC-20 Cyndi Tuell, Western Watersheds Project	If the pipelines will be buried, please disclose the anticipated cost of burying the pipelines.	The proposed action is to bury the pipeline 18 to 24 inches deep. According to the NRCS, the average cost of installing the pipeline is $2.50 per foot, which includes the cost of the pipe and the installation.
Comment #SC-21 Cyndi Tuell, Western Watersheds Project	How often would buried pipeline need to be repaired or replaced?	See response to Comment No. SC-18.

Comment No. / Commenter	Comment	Response
Comment #SC-22 Cyndi Tuell, Western Watersheds Project	Will native plants have time to regenerate (anticipated at 3-5 years) between replacement or repair of the pipeline?	Yes. Although repairs may include digging to find and repair leaks or clogs in the pipe, it is anticipated that these repairs would not occur very frequently or consistently in the same location(s), thus allowing vegetation to re-establish.
Comment #SC-23 Cyndi Tuell, Western Watersheds Project	Is this allotment meeting all rangeland health standards?	The land health evaluation for the Clayhole Allotment indicated that the allotment is making progress towards meeting the applicable standards for rangeland health.
Comment #SC-24 Cyndi Tuell, Western Watersheds Project	When was the last time a Land Health Evaluation was completed for this allotment?	The land health evaluation was completed in September 2008. However, allotment monitoring continues to be conducted.
Comment #SC-25 Cyndi Tuell, Western Watersheds Project	If all standards are being met, why is there any need for this project?	While the allotment is progressing toward meeting meeting land health standards, the proposed project would still be beneficial to land health – reliable water sources would result in a 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 project. 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 is progressing toward meeting land 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).
Comment #SC-26	Are there areas of this allotment that are currently not used by livestock? How would this project change that use?	The proposed project is within a grazing allotment that is available for livestock use and has a current and valid grazing permit. As such, utilization of up to 50% of current year's growth can occur on all parts of the allotment. Note that this 50% utilization is averaged

Comment No. / Commenter	Comment	Response
Cyndi Tuell, Western Watersheds Project		across an entire use area (generally on a pasture basis), although utilization is often unevenly distributed across pastures and the allotment as a whole. Livestock primarily graze near current water sources, so those areas receive a disproportionate share of the grazing utilization. However, other areas of the allotment receive little grazing, and utilization across each pasture does not exceed 50%. The proposed action would provide reliable water sources throughout the allotment for both livestock and wildlife. Because most of the existing reservoirs within the allotment are unreliable due to their inability to retain water, there is a need for better water distribution. 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 and soil resources. The proposed action would therefore result in a more uniform utilization of forage, which would aid in maintaining and improving the desired plant community objectives. The uniformity in livestock distribution would enhance rangeland vegetation by accelerating plant succession while increasing plant diversity and vigor.
Comment #SC-27 Cyndi Tuell, Western Watersheds Project	What is the date of the Allotment Management Plan for this allotment?	The allotment management plan was completed and signed February 12, 1992.
Comment #SC-28 Cyndi Tuell, Western	What is the forage availability?	Animal Unit Months (AUMs) is a term used to describe the forage availability or carrying capacity of a given forage or pasture. The Clayhole Allotment is permitted for 9,378 active AUMs, which represents 50 percent of the available forage.
Comment #SC-29 Cyndi Tuell, Western Watersheds Project	What are the forage species?	See Section 3.4.2 of the EA for a list of key forage species on the allotment.

Comment No. / Commenter	Comment	Response
Comment #SC-30 Cyndi Tuell, Western Watersheds Project	How will this project increase the spread of non-native invasive species of plants?	As described in Table 3.2 of the EA, proper grazing use which maintains stable plant communities (as is the case in this allotment – see discussion on rangeland health in Section 3.2.1 of the EA) should minimize or have no effect on the spread of cheatgrass and other invasive non-native species. In addition, measures are included in the proposed action (see Section 2.2.1) that would also help control the spread of invasive species.
Comment #SC-31 Cyndi Tuell, Western Watersheds Project	What are the impacts of the proposed project on native plants, especially rare plants?	Impacts to vegetation are analyzed in Chapter 4 of this EA. See Table 3.2 for a discussion on threatened, endangered, or candidate plant species and sensitive plant species.
Comment #SC-32 Cyndi Tuell, Western Watersheds Project	What are the impacts of the proposed project on soils?	See Table 3.2 for a discussion on soil resources within the Clayhole Allotment and anticipated effects as a result of the proposed action. Please note that measures are included in the proposed action (see Section 2.2.1) that would minimize impacts to soils.
Comment #SC-33 Cyndi Tuell, Western Watersheds Project	How often is this allotment monitored?	Long-term (trend) monitoring and composition data collection is performed every five years; allotment inspections and utilization monitoring generally occur every year. This information is included in Section 4.4 of the EA.
Comment #SC-34 Cyndi Tuell, Western Watersheds Project	As for alternatives, we recommend the BLM consider an alternative that does not authorize this massive water development project and instead reduces livestock grazing on the allotment to match the capacity of the land to support livestock, or as is likely the case, eliminates livestock grazing which appears to be completely unsuitable for this area by permanently closing the allotment.	See response to Comment No. SC-2.

Comment No. / Commenter	Comment	Response
Comment #SC-35 Cyndi Tuell, Western Watersheds Project	WWP strongly encourages the BLM to prepare an Environmental Impact Statement for the large-scale water development project.	The EA represents the hard look requirement as per NEPA. This EA has been prepared by an interdisciplinary team of resource specialists (see Table 5.1) and many resources and elements of the human environment were considered. Table 3.2 lists the resources/elements of the human environment that were considered, and Chapters 3 and 4 present those resources that would be potentially impacted and are therefore carried forward for detailed analysis. The EA provides sufficient evidence and analysis for determining the significance of effects from the proposed action (40 CFR 1508.9). The EA analysis suggests that no significant effects are anticipated from implementation of the proposed action. If this is the case, a FONSI will be prepared; if not, an EIS will be developed.
Comment #SC-36 Cyndi Tuell, Western Watersheds Project	Please explain how the impacts of this proposed project are not undue or unnecessary.	As stated previously, the proposed project is within a grazing allotment that is available for livestock use and has a current and valid grazing permit. The Clayhole Allotment consists of 115,552 acres; the proposed action's area of potential ground/vegetation disturbance totals 112 acres (new disturbance plus the disturbance in existing disturbed areas, i.e., roads, reservoirs, etc. – see EA Table 2.2), which is 0.001 percent of the acres within the allotment. The pipeline and fence areas would result in permanent loss of vegetation on approximately 7.5 acres. (EA p.8) Under the best management practices described in Section 2.2.1 of the 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. 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 these factors would thus facilitate perennial vegetative recovery and response in disturbed areas, and would result in minimal long-term effects to soils. Thus, resource degradation would not occur outside the 7.5 acres where vegetation would be permanently removed to at the site of water troughs and tanks as well as the proposed fence.

Comment No. / Commenter	Comment	Response
		As stated in this EA, 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). See also response to Comment No. SC-35. In addition, please note that the term "unnecessary and undue degradation" refers to mining activities regulated under the 43 CFR 3809 regulations, and not to rangeland management actions.
Comment #SC-37 Cyndi Tuell, Western Watersheds Project	An increase in trampling increases soil erosion and loss of biological soil crust.	See response to Comment No. SC-26, SC-32 and SC-36.
Comment #SC-38 Cyndi Tuell, Western Watersheds Project	We ask the BLM to please consider the following articles as this project moves forward: • Abella, S.R., Berry, K.H., 2016. Issues and Perspectives: Enhancing and Restoring Habitat for the Desert Tortoise. Journal of Fish and Wildlife Management, Vol. 7, Issue 1, pp. 255-280. • Abella, S.R., Guida, R.J., Roberts, C.L., Normal C.M., Holland, J.S., 2019. Persistence and turnover in desert plant communities during a 37-year period of land use and climate change. Ecological Monographs 00(00):e01390. Ecological Society of America. • Webb and Stielstra 1979 • Brooks et al. 2006 • Hansen and Martin 1973 • Hansen et al. 1976 • Coombs 1979	The BLM considers all relevant information when assessing the impacts of a proposed action. Thank you for providing these references. It appears as though all of the cited articles address desert tortoise habitat. Please note that the proposed project area is not within desert tortoise habitat. *Update to comment response:* BLM resource specialists considered each of these articles in its analysis for this proposed project. Please see response to EA Comment Nos. EA-18 through EA-45 in Table B-2 of this appendix.

Comment No. / Commenter	Comment	Response
	• Medica et al. 1982 • Oldemeyer 1994 • Ostermann-Kelm et al. 2009 • McKnight 1958 • Beever 2013 • Abella 2015 • Minnich 2008	

A preliminary EA was distributed for a 30-day comment period from July 30 to August 30, 2021. Comments are shown in Table B-2 (below), along with a response to the comment; comments that were not considered substantive (e.g., opinions or preferences) did not receive a formal response but were considered in the decision-making process.

Table B-2. Public Comments on Preliminary EA and Responses

Comment # / Commenter	Comment	Response
Comment #EA-1 Cyndi Tuell, Western Watersheds Project	The BLM did not address our proposed alternative: one that does not authorize this massive water development project and instead reduces livestock grazing on the allotment to match the capacity of the land to support livestock, or as is likely the case, eliminates livestock grazing which appears to be completely unsuitable for this area by permanently closing the allotment. The only alternative that was considered but eliminated from analysis was an alternative to construct earthen reservoirs. The failure to develop, analyze and discuss our proposed alternative, or at least explain why this alternative was not included, is a violation of the National Environmental Policy Act (NEPA).	A discussion of this alternative was added to Chapter 2 of the EA (see Section 2.4.2 – Alternatives Considered but Eliminated from Detailed Analysis). It was determined that this alternative is outside the scope of the EA as it would not respond to the purpose and need for action, and is therefore not appropriate for analysis in this EA. Livestock grazing will be evaluated and addressed during the permit renewal process for the Clayhole Allotment. The proposed project is within a grazing allotment that is available for livestock use within the Arizona Strip Field Office RMP, and that has 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 and allotment monitoring data) is considered and evaluated.
Comment #EA-2	The Clayhole allotment is not meeting rangeland health standards, is classified as an "Improve" allotment, has an outdated Allotment	Section 1.2 of the EA describes the purpose and need for the proposed action. The proposed action would result in a more

Comment # / Commenter	Comment	Response
Cyndi Tuell, Western Watersheds Project	Management Plan from 1992 (nearly three decades old), and an outdated Land Health Evaluation from 2008 (over a decade old).	uniform utilization of forage across the allotment, which would aid in maintaining and improving the desired plant community (DPC) objectives. The uniformity in livestock distribution would enhance rangeland vegetation by accelerating plant succession while increasing plant diversity and vigor. Water distribution within the 13 pastures is limited because most of the existing reservoirs are unreliable, dependent on rainfall events to refill, lack in water storage capabilities, and leak due to the inability of soils to retain water. The proposed action is designed to provide reliable water throughout the allotment for both livestock and wildlife. Installing a rangeland water development alone does not improve rangeland health. However, the proposed action does provide the land manager and the grazing permittee a more reliable and functional grazing system, which delivers more control in uniform distribution and utilization across the allotment. These benefits from the proposed action would result in improving rangeland health. While it is true that the allotment management plan (AMP) was signed in 1992, the best pasture rotation prescribed in the AMP is being used and the allotment is making significant progress toward meeting the applicable standard of rangeland health. The BLM continues to monitor the allotment (trend, utilization, grazing compliance). Land health evaluations are completed as a qualitative inventory for assessing BLM range lands. While the original LHE report for the Clayhole Allotment was completed in 2008, the BLM has continued to monitor the allotment and collect vegetative data. Frequency trend plots have been established in most of the pastures and are reread every five years, dating back to 1982. This data is analyzed periodically so that rangeland health and condition of the vegetation communities is kept current.
Comment #EA-3 Cyndi Tuell, Western Watersheds Project	While we appreciate the BLM's efforts to address some of our questions, we remain concerned that BLM intends to add an industrial level of infrastructure to artificially prop up the livestock grazing industry in an area that is clearly unsuited for this purpose.	See response to Comment Nos. EA-1 and EA-2.

Comment # / Commenter	Comment	Response
Comment #EA-4 Cyndi Tuell, Western Watersheds Project	The Arizona Game and Fish Department identifies this allotment as being located in a high value unfragmented area with ground water depletion concerns. The addition of fencing and pipelines to fill storage tanks with tens of thousands of gallons of water, presumably pumped from groundwater, will negatively impact the unfragmented value of the area and increase the depletion of groundwater.	Wildlife habitat fragmentation occurs when man-made barriers such as roads, urban areas, and railroads affect the movement patterns of wildlife. The proposed fencing would be designed to meet AGFD and BLM wildlife specifications (i.e., the bottom strand would consist of twisted barbless wire) to facilitate safe passage of mule deer, pronghorn, and other wildlife species. These wildlife-friendly fences allow passage underneath, though, and over the fences and would ensure access to fenced reservoirs by wildlife while not impacting the natural movement of wildlife. This information has been added to section 2.2 of the EA. In addition, best management practices have been incorporated into the design of the proposed action to minimize impacts to environmental resources (including vegetation and wildlife). The project would not result in fragmentation of wildlife habitat. The two existing wells, Clayhole and Black Point, would be connected to the pipeline and ground water would be used. However, most of the water used would be pumped from ponds and from Yellowstone Spring, all located within the allotment. In addition, groundwater pumping is regulated by the State of Arizona, not by the BLM.
Comment #EA-5 Cyndi Tuell, Western Watersheds Project	The proposed action is located within an Area of Critical Environmental Concern (for the Siler pincushion cactus), yet BLM declines to take a hard look at the impacts of livestock grazing on the Siler pincushion cactus (*Pediocactus sileri*) because "[t]he pipeline and associated structures lie south of the boundary, outside the ACEC. The alternatives would not affect management of the ACEC." However, increased livestock distribution as a result of the pipelines and troughs could impact the Siler pincushion and this information should be disclosed. The EA goes on to indicate the proposed pipeline route would be within one-to two-thousand feet of four populations of the Siler pincushion, the cactus populations are not regularly monitored, and that the one population of cactus that is regularly monitored is impacted by livestock trampling. We do not assume, and nor should the BLM, that the proposed pipeline and troughs, which will be	Please refer to Table 3.2 of the EA for a discussion on potential effects to Siler pincushion cactus. As described in that table, the BLM determined that the populations of *P. sileri* in the Clayhole Allotment would not be affected by cattle trampling as a result of the proposed water facilities. The BLM also determined that the proposed pipeline and troughs, while present in the same pastures as the plant populations, would not affect these populations.

Comment # / Commenter	Comment	Response
	present in the same pastures as the cactus, will not affect these populations of cactus. The BLM must provide additional analysis and monitoring of all populations of the cactus if it moves forward with this project.	
Comment #EA-6 Cyndi Tuell, Western Watersheds Project	In our prior comments we asked BLM specific questions related to the impacts fencing and pumping would have on wildlife: • What wildlife will benefit from this project other than huntable wildlife?	See response to Comment No. SC-7 in Table B-1 of this appendix.
Comment #EA-7 Cyndi Tuell, Western Watersheds Project	How will the livestock grazing supported by the water development harm the wildlife this water development is supposedly going to benefit?	See response to Comment No. SC-8 in Table B-1 of this appendix.
Comment #EA-8 Cyndi Tuell, Western Watersheds Project	• How will the reservoirs that include fencing benefit wildlife and which wildlife specifically?	See response to Comment Nos. EA-4 and EA-6. The existing reservoirs are a current source of water for both livestock and wildlife and would remain so. See Section 3.4.3 of the EA for a list of wildlife anticipated to occur in the project area, and Section 4.2.3 for potential effects to these species as a result of the proposed action.
Comment #EA-9 Cyndi Tuell, Western Watersheds Project	Will the fencing do more harm to wildlife than the water development will benefit them?	See response to Comment No. SC-9 (in Table B-1) and Comment Nos. EA-4, EA-6, and EA-8.
Comment # EA-10 Cyndi Tuell, Western Watersheds Project	BLM failed to adequately address our concern regarding inadequate water distribution for current livestock use and the impacts of this has on natural resources.	The proposed project is within a grazing allotment that is available for livestock use and has a current and valid grazing permit. As such, utilization of up to 50% of current year's growth can occur on all parts of the allotment. Note that this 50% utilization is averaged across an entire use area (generally on a pasture basis), although utilization is often unevenly distributed across pastures and the allotment as a whole. Livestock use is distributed unevenly in areas where there is inadequate water distribution. Livestock primarily graze near current water sources, so those areas receive a disproportionate share of the grazing utilization. However, other

Comment # / Commenter	Comment	Response
		areas of the allotment receive little grazing, and utilization across each pasture does not exceed 50%. In addition, please see response to Comment Nos. EA-2 and EA-7.
Comment #EA-11 Cyndi Tuell, Western Watersheds Project	We previously asked about the source of funds for this project and what is the anticipated cost. BLM's response was to state that funds are not currently allocated but may be provided by the permittee, the NRCS, the Arizona Strip Grazing Board, the AZGFD, and "potentially the BLM, since public land resources would benefit from the installation of new waters..." EA 2021 at 60. The BLM needs to identify the anticipated costs and how much of those costs will be borne by the public so that the public can make an informed assessment regarding the wisdom of utilizing public funds and lands to support private industry and whether the costs outweigh the benefits. Why is the public being asked to bear the costs of this private business operation?	Because funds are currently not allocated for the proposed project, any attempt to estimate how much of the cost of the proposed projects would be borne by the permittee and how much would be borne by the agencies listed below would be speculation. There are no current funding requests or application for the proposed project. See response to Comment No. SC-1 in Table B-1 of this appendix.
Comment #EA-12 Cyndi Tuell, Western Watersheds Project	What is the actual use of this allotment for the last 10 years? This information is critical to understanding the likely impacts of increased distribution of livestock on the natural resources found in the project area and to give the public an actual understanding of how livestock use affects publicly managed lands. Has actual use been equal to or less than permitted use? Is this project an attempt to facilitate livestock grazing on otherwise unsuitable lands?	Some years the actual use has been near the permitted use and some years substantially lower, however, the permittee still retains the preference to utilize all permitted AUMs as long as the 50% utilization is not exceeded. The BLM is not proposing any change to permitted livestock numbers, and construction of the proposed range improvements would not result in an increase in permitted use. Current monitoring data and the LHE do not suggest that the Clayhole Allotment is unsuitable for livestock grazing.
Comment #EA-13 Cyndi Tuell, Western Watersheds Project	In our prior comments we noted that these lands are apparently unsuitable for livestock grazing given how arid they are and the soil's inability to hold water in existing stock tanks. After our review of the EA, we still do not understand, and ask the BLM to please explain, why the BLM is choosing to continue livestock grazing on this allotment at great public expense, including the damage to federally managed public lands in addition to the costs related to propping up livestock grazing infrastructure for a private corporation, the Heaton Cattle, Company.	See response to Comment Nos. EA-1, EA-2, EA-11 and EA-12. Please note that the proposed project would not affect the BLM's ability to work with the permittee to adjust livestock numbers in situations such as drought. During drought years, the number of cattle grazed on the allotment are reduced to prevent adverse effects to rangeland resources.

Comment # / Commenter	Comment	Response
Comment #EA-14 Cyndi Tuell, Western Watersheds Project	We previously asked BLM to identify the impacts of this project on all other wildlife. For example, wildlife are directly negatively impacted by water developments from crushing and displacement during construction, and drowning after the tanks are filled. Wildlife are indirectly impacted when people leave trash at the water developments or use tanks a target shooting backdrops. Additionally, BLM must disclose and analyze the impacts of livestock waters supposedly beneficial to wildlife that will be filled, then allowed to dry, to essentially follow livestock use around the allotment. If wildlife become dependent upon a livestock water that is then allowed to dry, how will this negatively impact wildlife? How will these sporadically filled livestock waters provide a "reliable source" of wildlife waters?	Refer to Section 2.2.1 for best management practices to be implemented to reduce or eliminate impacts on wildlife resources. See Section 3.4.3 of the EA for a list of wildlife anticipated to occur in the project area, and Section 4.2.3 for potential effects to these species as a result of the proposed action. As described in Section 2.2 of the EA, the proposed waters would provide reliable water that would not sporadically be filled but would be made available year-round. When cattle are removed from a pasture, troughs would be left full of water and available to wildlife.
Comment #EA-15 Cyndi Tuell, Western Watersheds Project	How often is this allotment monitored, specifically for rangeland monitoring? The EA states simply that "rangeland monitoring...would continue" but does not provide any time frames, frequencies, or monitoring site information.	Long-term (trend) monitoring and composition data collection is conducted every five years; allotment inspections and utilization monitoring are conducted every year. This information has been added to Section 4.4 of the EA.
Comment #EA-16 Cyndi Tuell, Western Watersheds Project	WWP again strongly encourages the BLM to prepare an Environmental Impact Statement for the large-scale water development project.	See response to Comment No. SC-35 in Table B-1 of this appendix.
Comment #EA-17 Cyndi Tuell, Western Watersheds Project	We asked BLM to explain how the impacts of this proposed project are not undue or unnecessary. We are referred to section 3.2 and Chapter 4 of the EA, but we cannot find an actual response to our concern about the undue and unnecessary degradation of resources that are likely to result from implementation of this project. We again ask for an answer to this question.	As stated previously, the proposed project is within a grazing allotment that is available for livestock use and has a current and valid grazing permit. The Clayhole Allotment consists of 115,552 acres; the proposed action's area of potential ground/vegetation disturbance totals 112 acres (new disturbance plus the disturbance in existing disturbed areas, i.e., roads, reservoirs, etc. – see EA Table 2.2), which is 0.001 percent of the acres within the allotment. The pipeline and fence areas would result in permanent loss of vegetation on approximately 7.5 acres. (EA p.8)

Comment # / Commenter	Comment	Response
		Under the best management practices described in Section 2.2.1 of the 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. 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 these factors would thus facilitate perennial vegetative recovery and response in disturbed areas. Thus, resource degradation would not occur outside the 7.5 acres where vegetation would be permanently removed to at the site of water troughs and tanks as well as the proposed fence. As stated in this EA, 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). See also response to Comment No. SC-35 in Table B-1 of this appendix. In addition, please note that the term "unnecessary and undue degradation" refers to mining activities regulated under the 43 CFR 3809 regulations, and not to rangeland management actions.
Comment #EA-18 Cyndi Tuell, Western Watersheds Project	In our prior comments we provided several references and asked the BLM to consider them. Unfortunately, BLM dismissed our relevant references because BLM mistakenly believes all the cited references relate to desert tortoises. This is incorrect. We provide the non-tortoise related references again below and again ask the BLM to fully consider these references, as required by NEPA:	The BLM considers all relevant information when assessing the impacts of a proposed action. Thank you for providing these references. However, please note that the references provided discuss the long-term changes in desert ecological communities, land use plans and climate change, and is therefore outside the scope of and not applicable to the analysis in this EA.

Comment # / Commenter	Comment	Response
	Abella, S.R., Guida, R.J., Roberts, C.L., Normal C.M., Holland, J.S., 2019. *Persistence and turnover in desert plant communities during a 37-year period of land use and climate change.* Ecological Monographs 00(00):e01390. Ecological Society of America. The current climate with fewer freezes, together with reduced grazing, could be among the most optimal for desert perennials in the past century, although potential response lags to continuing warming and drying are uncertain. This study of long-term elevational shifts in communities during global change is among few in deserts, and the average upward elevational shift of 6 m/ decade for species in our study is within the range reported for temperate biomes. However, the 41% of species moving downslope is unusually high. We propose that dynamics within desert perennial communities follow a core-transient species model where a site's species are either highly persistent or transient in approximately equal proportions. Multiple global change drivers interact concurrently in some landscapes (McCarty 2001). Drivers such as land use (e.g., livestock grazing), fire regimes, and biological invasions often produce complex, interactive effects with climate (Groffman et al. 2012). In addition to fire, grazing by livestock, the most extensive human land use covering 25% of terrestrial Earth, has influenced vegetation structure and can interact with climate change (Asner et al. 2004). Most native plant abundance measures, such as cover and species density, increased over time, and none decreased. Seemingly paradoxically, these increases coincided with a warming and drying climate. Possible causes for the native plant increases include recovery from livestock and feral animal grazing (which was reduced and eliminated after 1994 in the study area), shifts in precipitation timing, fewer freezes, and interactions among these factors. Native grasses are among the most favored perennial species by livestock including feral burros in southwestern drylands and	

Comment # / Commenter	Comment	Response
	have increased under protection from grazing (Blydenstein et al. 1957, Abella 2008). Responses of other plant groups could also be consistent with recovery from grazing. For example, two forbs showing among the largest temporal increases, Mirabilis laevis and Lotus rigidus, are favored forage species (Jennings and Berry 2015). Shrubs generally are less preferred forage than forbs and perennial grasses, but among shrubs, Krameria grayi and Ambrosia dumosa can be utilized by large herbivores (Blydenstein et al. 1957, Webb and Stielstra 1979, Bowers 1997, Abella 2008). Both of these species increased in cover after 1979 in our study. However, other shrubs, typified by Larrea tridentata, also increased and are not preferred forage (Webb and Stielstra 1979). Changes could be mediated through "nurse plant" effects, where perennial plants provide favorable environments below their canopies for the recruitment of other plants. McAuliffe (1988), for instance, found that 67–90% of juvenile Larrea occurred below existing perennials even though most of the landscape was open ground. Given the importance of nurse plants to the recruitment of Larrea and other species, increased total cover of perennials and the resulting increase in potential nurse plants could increase favored and non-favored forage species alike. The increase in species diversity that we observed after livestock grazing stopped would be consistent with recovery under some models of grazing effects in global ecosystems. For example, one model holds that species diversity increases with reduced grazing pressure in low resource environments with a short-history of grazing (Cingolani et al. 2005). Under this scenario, removal of grazing would increase diversity rather than decrease it, opposite the prediction for more productive biomes with a long history of grazing. The overall increase in native plant abundance has coincided with a period generally characterized by protection from livestock grazing, rising atmospheric CO2 concentration, warming temperatures, and multi-year extremes of precipitation. While the potential importance of these factors or their interaction in changing desert communities	

Comment # / Commenter	Comment	Response
	remains poorly understood, it seems clear that the overall set of growing conditions during the last several decades in many protected areas of hot deserts has been favorable for many perennial species [in the absence of livestock grazing]	
Comment #EA-19 Cyndi Tuell, Western Watersheds Project	Allington, G.R.H.and T. J. Valone. 2011. Long-term livestock exclusion in an arid grassland alters vegetation and soil. Rangeland Ecology Management 64(4):424-428. Changes in soil and vegetation due to livestock grazing are occurring in arid lands throughout the world. The most extreme cases result in desertification, which is seen as largely irreversible, because of altered soil properties. To understand better how long-term livestock removal affects soil properties and vegetation, we compared water-infiltration rates, soil bulk density, and perennial grass cover inside and outside a long-term livestock exclosure in an arid grassland site in southeastern Arizona, United States. The site had not been desertified at the time of this study. Exclusion of livestock for 40 yr was associated with lower bulk density and higher water infiltration in both the dry and wet seasons. Perennial grass cover was higher and two native grasses, Eragrostis intermedia and Bouteloua hirsute were significantly more common (P , 0.05) in the ungrazed area. These findings parallel our results from a desertified site and suggest that changes in soil physical properties associated with long-term livestock removal are not an artifact of desertification and can take place in a system that has remained in a grassland state. Our data suggest that, although significant changes in species composition have occurred, this grassland is relatively resilient to substantial changes in soil physical properties.	As stated above, the BLM considers all relevant information when assessing the impacts of a proposed action. However, please note that the literature provided discusses the changes in soil and vegetation due to livestock grazing which is outside the scope of this EA. This issue would be addressed during the permit renewal process for the allotment.
Comment #EA-20 Cyndi Tuell, Western Watersheds Project	Brice, E. M., B. A. Miller, H. Zhang, K. Goldstein, S. N. Zimmer, G. J. Grosklos, P. Belmont, C. G. Flint, J. E. Givens, P. B. Adler, M. W. Brunson and J. W. Smith. 2020. Impacts of climate change on multiple use management of Bureau of Land Management land in the Intermountain West, USA. Ecosphere 11(11):e03286. 10.1002/ecs2.3286 Although natural resource managers are concerned about climate change, many are unable to adequately incorporate climate change science into their adaptation strategies or management plans and are not always aware of or do not always employ the most current	See response to Comment No. EA-18.

Comment # / Commenter	Comment	Response
	scientific knowledge. One of the most prominent natural resource management agencies in the United States is the Bureau of Land Management (BLM), which is tasked with managing over 248 million acres (>1 million km2) of public lands for multiple, often conflicting, uses. Climate change will affect the sustainability of many of these land uses and could further increase conflicts between them. As such, the purpose of our study was to determine the extent to which climate change will affect public land uses, and whether the BLM is managing for such predicted effects. To do so, we first conducted a systematic review of peer-reviewed literature that discussed potential impacts of climate change on the multiple land uses the BLM manages in the Intermountain West, USA, and then expanded these results with a synthesis of projected vegetation changes. Finally, we conducted a content analysis of BLM Resource Management Plans in order to determine how climate change is explicitly addressed by BLM managers, and whether such plans reflect changes predicted by the scientific literature. We found that active resource use generally threatens intrinsic values such as conservation and ecosystem services on BLM land, and climate change is expected to exacerbate these threats in numerous ways. Additionally, our synthesis of vegetation modeling suggests substantial changes in vegetation due to climate change. However, BLM plans rarely referred to climate change explicitly and did not reflect the results of the literature review or vegetation model synthesis. Our results suggest there is a disconnect between management of BLM lands and the best available science on climate change. We recommend that the BLM actively integrates such research into on-the-ground management plans and activities, and that researchers studying the effects of climate change make a more robust effort to understand the practices and policies of public land management in order to effectively communicate the management significance of their findings. Beschta, R.L., D.L. Donahue, D.A. DellaSala, J.J. Rhodes, J.R. Karr, M.H. O'Brien, T.L. Fleischner, C.D. Williams. Adapting to climate change on western public lands: Addressing the ecological effects of domestic, wild, and feral ungulates. Environmental Management.	

Comment # / Commenter	Comment	Response
Comment #EA-21 Cyndi Tuell, Western Watersheds Project	Beschta, R.L., D.L. Donahue, D.A. DellaSala, J.J. Rhodes, J.R. Karr, M.H. O'Brien, T.L. Fleischner, C.D. Williams. Adapting to climate change on western public lands: Addressing the ecological effects of domestic, wild, and feral ungulates. Environmental Management.	The ecological effects of domestic, wild, and feral ungulates would be addressed during the permit renewal process. This issue is outside the scope of the current EA and therefore not applicable to this analysis.
Comment #EA-22 Cyndi Tuell, Western Watersheds Project	Bahre, C.J. and M.L. Shelton. 1993. Historic vegetation change, mesquite increases, and climate in southeastern Arizona. Journal of Biogeography 20: 489-504; Brown, J.H., T.J. Valone, and C.G. Curtin. 2007. Reorganization of an arid ecosystem in response to recent climate change. PNAS94: 9729-9733. Except possibly for increases in woody xerophytes such as mesquite, all of the identified long-term vegetation changes appear to be of anthropogenic origin. Mesquite increases, however, are irregular, show no clear relation to precipitation variations, and are most likely the result of livestock grazing and/or fire exclusion.	See response to Comment Nos. EA-19 and EA-21.
Comment #EA-23 Cyndi Tuell, Western Watersheds Project	Bahre, C.J. and M.L. Shelton. 1996. Rangeland destruction: Cattle and drought in southeastern Arizona at the turn of the century. J. of the Southwest 38 (1): 1-22. Recurring droughts and overstocking the open range led to huge cattle die-offs and degraded range conditions during the droughts of 1891-93 and 1898-1904. Since then, because of more efficient transportation, increased supplemental feeding, greater water development, and improved cattle marketing, droughts no longer exact major cattle die-offs on the range.	See response to Comment Nos. EA-1 and EA-18.
Comment #EA-24 Cyndi Tuell, Western Watersheds Project	Bock, C.E., J.H. Bock, W.R. Kenney, V.M. Hawthorne. 1984. Responses of Birds, Rodents, and Vegetation to Livestock Exclosure in a Semidesert Grassland Site. J. Range Management 37:239-242. In 1981-82, a protected upland site supported 45% more grass cover, a comparatively mixed group of grass species, and 4 times as many shrubs as an adjacent grazed site. The grazed area supported a significantly higher number of birds in summer, while numbers did	See response to Comment Nos. EA-7 and EA-19.

Comment # / Commenter	Comment	Response
	not differ in winter. Rodents were significantly more abundant inside the protected area.	
Comment #EA-25 Cyndi Tuell, Western Watersheds Project	Bock, C.E., J.H.Bock. 1993. Cover of Perennial Grasses in Southeastern Arizona in Relation to Livestock Grazing. Conservation Biology 7: 371-377. Total grass canopy cover was greater on ungrazed grasslands. Eight bunchgrass species also grew taller on ungrazed areas --the three tallest species (*Bouteloua curtipendula*, *Bothriochloa barbinodis*, and *Eragrostis intermedia*) showed the greatest increase on ungrazed areas. Two short stoloniferous species (*Hilaria belangeri* and *Bouteloua eriopoda*) were the only taxa substantially more abundant on grazed areas. *Bouteloua gracilis*, the most abundant grass in the region, showed an intermediate response to release from grazing. Livestock grazing appeared to be an exotic ecological force in these southwestern grasslands, and one destructive of certain components of the native flora and fauna.	See response to Comment Nos. EA-1, EA-7, EA-18 and EA-19.
Comment #EA-26 Cyndi Tuell, Western Watersheds Project	Bock, C.E., J.H. Bock. 1993. Effects of Long-Term Livestock Exclusion in a Semiarid Grassland. Pp.123-133 in (P.G.Rowlands, C.Riper III, and M.K.Sogge, editors) Proceedings of the First Biennial Conference on Research in Colorado Plateau National Parks. National Park Service, Center for Colorado Plateau Studies, Northern AZ U., Flagstaff. Canopy cover of upland perennial grasses was 61% on the Appleton-Whittell Research Ranch (AWRR) and 41% on adjacent cattle ranches. Peak fall densities of grasshoppers were three times higher on grazed lands. The bunch grass lizard was the most abundant reptile on AWRR and virtually absent on adjacent ranches. Cottonrats, harvest mice, and hispid pocket mice were the most common rodents in ungrazed habitat, whereas deer mice and kangaroo rat predominated in grazed areas. Montezuma quail, Cassin's sparrows, Botteri's sparrows, and grasshopper sparrows were common breeding birds on AWRR, whereas scaled quail, horned larks, and lark sparrows were the most abundant nesting birds on grazed lands. •Bock, Carl E. and Jane H. Bock. 2000. Response of Winter Birds to Drought and Short-duration Grazing in Southeastern Arizona. P. 5 in (Linda Kennedy and Stephanie Seltzer,	See response to Comment No. Nos. EA-1, EA-7, EA-18 and EA-19.

Comment # / Commenter	Comment	Response
	editors) Audubon Research Ranch 2000. National Audubon Society Appleton-Whittell Research Ranch. Elgin AZ. 84 pgs. Abstract reports high-density short-duration rotational grazing, coupled with a drought, left the land in a substantially denuded condition through two winters, and this in turn negatively impacted a variety of resident and migratory birds dependent on ground cover and seed production for over-winter survival.	
Comment #EA-27 Cyndi Tuell, Western Watersheds Project	Bock, Carl E. and Jane H. Bock. 2000. Vegetative Changes in a Grass/Shrubland after Fifteen Years Without Disturbance. P. 8 in (Linda Kennedy and Stephanie Seltzer, editors) Audubon Research Ranch 2000. National Audubon Society Appleton-Whittell Research Ranch. Elgin AZ. 84 pgs. Preliminary results show that from 1985-2000 total shrub densities have decreased on Bald Hill on the Appleton-Whittell Research Ranch and that exotic lovegrasses are spreading significantly but slowly, despite the absence of fire, grazing, or other disturbance.	See response to Comment Nos. EA-1, EA-7, EA-18 and EA-19.
Comment #EA-28 Cyndi Tuell, Western Watersheds Project	Bock, Jane H., Carl E. Bock. 2002. Wildflowers, Weeds, Precipitation, and Livestock Grazing in an Arizona Grassland. Abstract: Ecological Society of America 87th Annual Meeting/Society for Ecological Restoration 14th Annual International Conference. August 4-9, Tucson, AZ. Pg.79. In summer of 2001 when winter precipitation had exceeded 25 cm., wildflower cover equaled that of native grasses and was significantly lower on livestock-grazed areas than on ungrazed native grassland, and much lower still in plantations of exotic African lovegrasses. Results suggest the important positive influence of winter rain on many of the wildflower species, and the negative effects of grazing and exotics.	See response to Comment Nos. EA-1, EA-7, EA-18 and EA-19.
Comment #EA-29 Cyndi Tuell, Western Watersheds Project	Bock, C., J. Bock, L. Kennedy, and Z. Jones. 2007a. Spread of non-native grasses into grazed versus ungrazed desert grasslands. Journal of Arid Environments 71:229–235. Indications are that (1) protection from grazing reduced the rate of exotic invasions into native grasslands; (2) areas deliberately planted with the exotics developed into near monocultures even under livestock exclusion; (3) livestock grazing is an exogenous	See response to Comment Nos. EA-1, EA-18 and EA-19.

Comment # / Commenter	Comment	Response
	disturbance to which exotics are better adapted than most native grasses.	
Comment #EA-30 Cyndi Tuell, Western Watersheds Project	Brady, W.W, M.R. Stromberg, E.F. Aldon, C.D. Bonham, S.H. Henry. 1989. Response of a Semidesert Grassland to 16 Years of Rest from Grazing. J. Range Management 42:284-288. Long-term response to release from grazing included both increases in types of grasses and significant increases in canopy cover for midgrass, shortgrass, shrub, and forb plant groups. Total vegetation cover was not significantly different on the grazed and ungrazed areas, but cover of midgrasses was significantly different (this difference due to increased cover of plains lovegrass on ungrazed pasture. Data do not support the hypothesis that continued animal impact is necessary to prevent ecosystem deterioration.	See response to Comment Nos. EA-1, EA-18 and EA-19.
Comment #EA-31 Cyndi Tuell, Western Watersheds Project	Filazzola, A., Brown, C., Dettlaff, M.A., Batbaatar, A., Granke, J., Bao, T., Heida, I.P., Cahill, J.F. Jr., 2020. The effects of livestock grazing on biodiversity are multi-trophic: a meta-analysis. Ecology Letters (2020). Anthropogenic disturbance has generated a significant loss of biodiversity worldwide and grazing by domestic herbivores is a contributing disturbance. Although the effects of grazing on plants are commonly explored, here we address the potential multi-trophic effects on animal biodiversity (e.g. herbivores, pollinators and predators). We conducted a meta-analysis on 109 independent studies that tested the response of animals or plants to livestock grazing relative to livestock excluded. Across all animals, livestock exclusion increased abundance and diversity, but these effects were greatest for trophic levels directly dependent on plants, such as herbivores and pollinators. Detritivores were the only trophic level whose abundance decreased with livestock exclusion. We also found that the number of years since livestock was excluded influenced the community and that the effects of grazer exclusion on animal diversity were strongest in temper-ate climates. These findings synthesise the effects of livestock grazing beyond plants and demonstrate the indirect impacts of livestock grazing on multiple trophic levels in the animal community. We identified the potentially long-term impacts that livestock grazing can have on lower trophic	See response to Comment Nos. EA-1, EA-18 and EA-19.

Comment # / Commenter	Comment	Response
	levels and consequencesfor biological conservation. We also highlight the potentially inevitable cost to global biodiversity from livestock grazing that must be balanced against socio-economic benefits. The effect of grazing on biodiversity patterns can depend on climate. In areas sensitive to disturbance, even minimal grazing can significantly alter the abundance or diversity of taxa within the community. For instance, ecosystems that have high abiotic stress with extremes in precipitation or temperature (e.g. the alpine or deserts) can be particularly impacted by grazing which damages soil characteristics (e.g. increase erosion, decrease water infiltration), reduces already limited plant biomass, and decreases animal diversity (Jones 2000; Sankaran & Augustine 2004; Evju et al. 2006). (p.2).	
Comment #EA-32 Cyndi Tuell, Western Watersheds Project	Gillihan, S. W. 2006. Sharing the land with pinyon-juniper birds. Partners in Flight Western Working Group. Salt Lake City, Utah. Pinyon-juniper woodland is a widespread ecosystem in the North American West, estimated at 55.6 million acres. It is widely regarded that the extent of pinyon-juniper is increasing as some grasslands and shrublands are transformed by PJ encroachment, facilitated by a combination of climatic changes, fire suppression, and overgrazing which removes the grassy understory that ordinarily carries fire. General guidelines for management of activities in PJ woodlands. Managing for a diversity of stand conditions across the landscape is recommended. Land managers should embrace natural processes that shape landscapes. Retaining large mature stands is important. Retaining beetle-killed pinyons rather than cutting them offers important habitat for birds and resources for habitat regeneration, the fire danger is only elevated while the reddish brown needles are still on the trees. Livestock grazing in and near PJ woodlands during the nesting season increases the potential for brood parasitism of PJ birds, especially when cattle are concentrated for prolonged periods and cowbirds have more time to find nearby nests. In grazed PJ woodlands, cowbirds may parasitize more than 75% of the nests of some species. (pg. 11).	The literature provided discusses the long-term changes in pinyon-juniper stands, pinyon juniper birds, and the effects of livestock grazing, fire suppression, land use plans and climate change, and is not applicable to the analysis in this EA. See also response to Comment Nos. EA-1, EA-18 and EA-19.
Comment #EA-33	Gregg R.M., and Kershner J. 2019. Extremes to Ex-Streams: Ecological Drought Adaptation in a Changing Climate. EcoAdapt, Bainbridge Island, WA.	See response to Comment Nos. EA-1, EA-18 and EA-19.

Comment # / Commenter	Comment	Response
Cyndi Tuell, Western Watersheds Project	Climate change is one of the most pressing challenges on natural and cultural resource management and conservation practice. Resource managers and conservation planners are addressing these challenges by revising current plans and practices with increased attention on potential climate impacts to natural resources, communities, and socioeconomic values to better meet long-term goals. However, decision-making is complicated by uncertainty in terms of which adaptation actions are best suited for different implementation conditions and supported by scientific evidence (Sutherland et al. 2004; Cook et al. 2009; Eriksen et al. 2011; Bayliss et al. 2012; Cross et al. 2012). The purpose of this and other EcoAdapt adaptation science assessments is to evaluate the body of scientific knowledge supporting specific climate adaptation actions to determine the conditions under which particular actions may be most effective for achieving management goals...Knowing which adaptation actions can be best implemented at different scales and in various ecosystems will help resource managers to identify and leverage funding opportunities, create new or enhance existing partnerships, and communicate and coordinate with other agencies and organizations to prioritize on-the-ground ecological drought responses. This project directly supports the expressed goal of the Northwest Climate Adaptation Science Center to provide scientific research and synthesis to support natural resource management in a changing climate.	
Comment #EA-34 Cyndi Tuell, Western Watersheds Project	Jones, A., and Carter, J. 2016. Implications of Longer-Term Rest from Grazing in the Sagebrush Steppe: an Alternative Perspective. Journal of Rangeland Applications, Vol. 3, pp. 1-8. In the inaugural volume of this journal, Davies et al. (2014) attempt to make a general case that livestock grazing is benign in sagebrush steppe, and long-term rest is not beneficial because modern "properly managed" grazing produces few significant differences compared to ungrazed areas. In this brief review, we point out the problems with this broad theory, not the least of which is a lack of supporting evidence that this "modern" grazing is afforded in the studies cited. Additionally, areas with invasive species such as cheatgrass are conflated with areas lacking these species, while	See response to Comment Nos. EA-1, EA-18 and EA-19.

Comment # / Commenter	Comment	Response
	threat of fire is used to drive management decisions to include livestock grazing as a tool for fire control regardless of the state of the land or the presence/absence of invasives. Davies et al. shed light on an important problem we face in the range science literature. They correctly note that the effect of light to moderate grazing, and other grazing management scenarios, have received relatively little study compared to long-term rest on sagebrush community recovery. One reason for this may be the scarcity of established large, grazing-free reserves or control areas in the western U.S. that include sagebrush steppe habitat. Establishing large, ungrazed areas throughout the sagebrush steppe may be one of the key steps we need to take to better understand the impacts of livestock grazing on our western rangelands as our climate changes. Davies et al. use the terms "well-managed grazing," "current managed grazing," "properly managed grazing," "managed grazing," and "modern grazing" interchangeably, but definitions are not offered for any of them and the articles cited offered little illumination on the subject. We look forward to working with the range science community, livestock operators, and land managers to help better define "well-managed" grazing, perhaps with more care towards truly sustainable utilization rates in the sagebrush steppe, and hope that one day this can be the predominant form of management in the sagebrush steppe, rather than the exception to the rule. •Jones, A. 2000. Effects of cattle grazing on North American arid ecosystems: A quantitative review. Western North American Naturalist 60:155-164. A quantitative review was conducted of the effects of cattle grazing in arid systems on 16 response variables ranging from soil bulk density to total vegetative cover to rodent species diversity. Various studies from North American arid environments that used similar measures for assessing grazing effects on the same response variables were used for the review; each study was assigned to serve as a single data point in paired comparisons of grazed versus ungrazed sites. All analyses tested the 1-tailed null hypothesis that grazing has no effect on the measured variable. Eleven of 16 analyses (69%) revealed significant detrimental effects of cattle grazing, suggesting that cattle can have a negative impact on North American xeric ecosystems. Soil-related variables were most negatively impacted by grazing (3 of 4 categories tested were significantly impacted), followed by litter	

Comment # / Commenter	Comment	Response
	cover and biomass (2 of 2 categories tested), and rodent diversity and richness (2 of 2 categories tested). Vegetative variables showed more variability in terms of quantifiable grazing effects, with 4 of 8 categories testing significantly. Overall, these findings could shed light on which suites of variables may be effectively used by land managers to measure ecosystem integrity and rangeland health in grazed systems.	
Comment #EA-35 Cyndi Tuell, Western Watersheds Project	Kistemaker, J. H., and M. C. Wicklow-Howard. 1999. Biological soil crusts: Natural barriers to Bromus tectorum L. establishment in the northern Great Basin, USA. VIth International Rangeland Congress —Proceedings, Townsville 109-111. In arid and semi-arid lands throughout the world, vegetation cover is often sparse or absent. Nevertheless, in open spaces between the higher plants, the soil surface is generally not bare of autotrophic life, but covered by a community of highly specialized organisms (Fig. 1.1). These communities are referred to as biological soil crusts, or cryptogamic, cryptobiotic, microbiotic, or microphytic soil crusts (Harper and Marble 1988; West 1990). Biological soil crusts are a complex mosaic of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria. Cyanobacterial and microfungal filaments weave through the top few millimeters of soil, gluing loose particles together and forming a matrix that stabilizes and protects soil surfaces from erosive forces (Cameron 1966; Friedmann and Galun 1974; Friedmann and Ocampo-Paus 1976; Belnap and Gardner 1993). These crusts occur in all hot, cool, and cold arid and semi-arid regions. They may constitute up to 70% of the living cover in some plant communities (Belnap 1994). However, biological soil crusts have only recently been recognized as having a major influence on terrestrial ecosystems.	See response to Comment Nos. EA-1, EA-18 and EA-19.
Comment #EA-36 Cyndi Tuell, Western Watersheds Project	McInturff, A., Xu, W., Wilkinson, C.E., Dejid, N., and Brashares, J.S. 2020. Fence Ecology: Frameworks for Understanding the Ecological Effects of Fences. BioScience XX: 1-15. Oxford University Press, American Institute of Biological Sciences. doi:10.1093/biosci/biaa103. (in press) Investigations of the links between human infrastructure and ecological change have provided eye-opening insights into	The literature provided states "Our review of 446 studies published from 1948 to 2018 showed that fences neither unequivocally protect nor harm ecosystems. The effects of fences on their ecological surroundings are diverse, and the same fence can be both beneficial and detrimental depending on species, scale, and type of effect considered" (McInturff 2020).

Comment # / Commenter	Comment	Response
	humanity's environmental impacts and contributed to global environmental policies. Fences are globally ubiquitous, yet they are often omitted from discussions of anthropogenic impacts. In the present article, we address this gap through a systematic literature review on the ecological effects of fences. Our overview provides five major takeaways: 1) an operational definition of fencing to structure future research, 2) an estimate of fence densities in the western United States to emphasize the challenges of accounting for fences in human-footprint mapping, 3) a framework exhibiting the ecological winners and losers that fences produce, 4) a typology of fence effects across ecological scales to guide research, and 5) a summary of research trends and biases that suggest that fence effects have been underestimated. Through highlighting past research and offering frameworks for the future, we aim with this work to formalize the nascent field of fence ecology.	See also response to Comment No. EA-4.
Comment #EA-37 Cyndi Tuell, Western Watersheds Project	Root, H.T., Miller, J. E.D., Rosentreter, R., 2020. Grazing disturbance promotes exotic annual grasses by degrading soil biocrust communities. Ecological Applications 30(1):e02016. 10.1002/eap.2016. Ecological Society of America. heatherroot@weber.edu Abstract. Exotic invasive plants threaten ecosystem integrity, and their success depends on a combination of abiotic factors, disturbances, and interactions with existing communities. In dryland ecosystems, soil biocrusts (communities of lichens, bryophytes, and microorganisms) can limit favorable microsites needed for invasive species establishment, but the relative importance of biocrusts for landscape-scale invasion patterns remains poorly understood. We examine effects of livestock grazing in habitats at high risk for invasion to test the hypothesis that disturbance indirectly favors exotic annual grasses by reducing biocrust cover. We present some of the first evidence that biocrusts increase site resistance to invasion at a landscape scale and mediate the effects of disturbance. Biocrust species richness, which is reduced by livestock grazing, also appears to promote native perennial grasses. Short mosses, as a functional group, appear to be particularly valuable for preventing invasion by exotic annual grasses. Our study suggests that maintaining biocrust communities with high cover, species richness, and cover of short	See response to Comment Nos. EA-1, EA-18 and EA-19.

Comment # / Commenter	Comment	Response
	mosses can increase resistance to invasion. These results highlight the potential of soil surface communities to mediate invasion dynamics and suggest promising avenues for restoration in dryland ecosystems.	
Comment #EA-38 Cyndi Tuell, Western Watersheds Project	Sisk, Thomas, Timothy Crews and Lauren Golten. 2000. Effects of Livestock Management on Ecosystem Productivity and Biological Diversity in Southwestern Grasslands. P. 31 in (Linda Kennedy and Stephanie Seltzer, editors) Audubon Research Ranch 2000. National Audubon Society Appleton-Whittell Research Ranch. Elgin AZ. 84 pgs. Results from a pilot study done after two consecutive drought years showed that aboveground, net primary productivity was significantly higher at the ungrazed site (the Appleton-Whittell Research Ranch) compared to the traditional and HRM managed ranches whereas plant species diversity did not vary significantly as a function of livestock management. The aim of a proposed study is to bridge the existing gulf between research science, ranchers, other land managers, and the public.	See response to Comment Nos. EA-1, EA-18 and EA-19.
Comment #EA-39 Cyndi Tuell, Western Watersheds Project	U.S. General Accounting Office. 1991b. Rangeland management: Bureau of Land Management's Hot Desert Program merits reconsideration. U.S. General Accounting Office. The U.S. General Accounting Office found that the Bureau of Land Management's grazing program in the Southwest was running at an annual loss of $1.3 million and predicted that putting an end to the program would not significantly disrupt local economies. The report instead found that the economic value of the lands could well be greater if they were managed for recreational and aesthetic benefits.	The BLM grazing program, as well as the economic value of public lands, are outside the scope of this EA.
Comment #EA-40 Cyndi Tuell, Western Watersheds Project	Wenjing Xu, Nandintsetseg Dejid, Valentine Herrmann, Hall Sawyer, Arthur D. Middleton. Barrier Behaviour Analysis (BaBA) reveals extensive effects of fencing on wide-ranging ungulates. Journal of Applied Ecology, 2021; DOI:10.1111/1365-2664.13806 As human activities expand globally, there is a growing need to identify and mitigate barriers to animal movements. Fencing is a pervasive human modification of the landscape that can impede the movements of wide-ranging animals. Previous research has largely	See response to Comment No. EA-36.

Comment # / Commenter	Comment	Response
	focused on whether fences block movements altogether, but a more nuanced understanding of animals' behavioural responses to fences may be critical for examining the ecological consequences and prioritizing conservation interventions. We developed a spatial- and temporal-explicit approach, Barrier Behaviour Analysis (BaBA, available as an r package), to examine individual-level behaviours in response to linear barriers. BaBA classifies animal-barrier encounters into six behaviour categories: quick cross, average movement, bounce, back-and-forth, trace and trapped. We applied BaBA to wide-ranging female pronghorn Antilocapra americana and mule deer Odocoileus hemionus in an area of western Wyoming, USA, with >6,000 km of fencing. We found both species were extensively affected by fences, with nearly 40% of fence encounters altering their normal movements, though pronghorn were more strongly affected than mule deer. On average, an individual pronghorn encountered fences 250 times a year—twice the encounter rate of mule deer. Pronghorn were more likely to bounce away from fences, whereas deer engaged in more back-and-forth, trace and average movement near fences. We aggregated these behavioural responses to demonstrate how BaBA can be used to examine species-specific fencing permeability and to identify problematic fence segments in order to guide fence modification or removal. Synthesis and applications. Our work provides empirical evidence on how fences affect wildlife movement. Importantly, Barrier Behaviour Analysis (BaBA) can be applied to evaluate other linear features (such as roads, railways and pipelines) and habitat edges, enhancing our ability to understand and mitigate widespread barrier effects to animal movement.	
Comment #EA-42	Williamson, M.A., Fleishman, E., Mac Nally, R.C., Chambers, J.C., Bradley, B.A., Dobkin, D.S., Fogarty, F.A., Horning, N., Leu, M., and Zillig, M.W., 2020. Fire, livestock grazing, topography, and precipitation affect occurrence and prevalence of cheatgrass (Bromus	This literature discusses the occurrence of cheatgrass and the effects of livestock grazing and fire on increasing or decreasing cheatgrass occurrence. Cheatgrass is present on the Clayhole allotment and is discussed in Table 3.2 of the EA, please note that livestock grazing

Comment # / Commenter	Comment	Response
Cyndi Tuell, Western Watersheds Project	tectorum) in the central Great Basin, USA. Biol Invasions22,663–680 (2020). https://doi.org/10.1007/s10530-019-02120-8 Cheatgrass (Bromus tectorum) has increased the extent and frequency of fire and negatively affected native plant and animal species across the Intermountain West (USA). However, the strengths of association between cheatgrass occurrence or abundance and fire, livestock grazing, and precipitation are not well understood. We used 14years of data from 417 sites across 10,000km2in the central Great Basin to assess the effects of the foregoing predictors on cheatgrass occurrence and prevalence (i.e., given occurrence, the proportion of measurements in which the species was detected). We implemented hierarchical Bayesian models and considered covariates for which > 0.90 or < 0.10 of the posterior predictive mass for the regression coefficient ≥ 0 as strongly associated with the response variable. Similar to previous research, our models indicated that fire is a strong, positive predictor of cheatgrass occurrence and prevalence. Models fitted to all sample points and to only unburned points indicated that grazing and the proportion of years grazed were strong positive predictors of occurrence and prevalence. In contrast, in models restricted to burned points, prevalence was high, but decreased slightly as the proportion of years grazed increased (relative to other burned points). Prevalence of cheatgrass also decreased as the prevalence of perennial grasses increased. Cheatgrass occurrence decreased as elevation increased, but prevalence within the elevational range of cheatgrass increased as median winter precipitation, elevation, and solar exposure increased. Our novel time-series data and results indicate that grazing corresponds with increased cheatgrass occurrence and prevalence regardless of variation in climate, topography, or community composition, and provide no support for the notion that contemporary grazing regimes or grazing in conjunction with fire can suppress cheatgrass.	will be evaluated and addressed during the permit renewal process for the Clayhole Allotment. See also response to Comment No. EA-1.
Comment #EA-43	Wuerthner, George, Mollie Matteson. 2002. Welfare Ranching: The Subsidized Destruction of the American West. Foundation for Deep Ecology, Sausalito, CA. 343 pgs.	See response to Comment Nos. EA-1 and EA-39.

Comment # / Commenter	Comment	Response
Cyndi Tuell, Western Watersheds Project	With photographs and essays, this book shows not only cases of overgrazing on both private and public lands but also the subtle changes that signal ecological disruption on a massive scale. It explains the cultural and historical causes of the wasting of the West and offers a vision of the renewal possible if citizens ask that their government shift land management priorities to serving the public and natural good, rather than facilitating private gain. It points the way to the greatest opportunity yet remaining that of ending public lands livestock grazing, for ecological restoration and wildlife protection in this country.	
Comment #EA-44 Cyndi Tuell, Western Watersheds Project	Yang, X., Xu, M., Zhao, Y., Bao, T., Ren, W., Shi, Y., 2020. Trampling Disturbance of Biocrust Enhances Soil Carbon Emission. Rangeland Ecology & Management (in press). Available at https://doi.org/10.1016/j.rama.2020.02.005 Biocrusts play an important role in the carbon cycle in arid and semiarid ecosystems. Activities such as livestock grazing can disturb ecosystem functions of biocrusts. However, it is unclear whether disturbance intensity impacts carbon emission from these biocrusts. Few studies have investigated the transformation of carbon within biocrusts after disturbance. Here, we conducted a field experiment on the Loess Plateau, China, in which we artificially simulated different intensities of trampling to examine the response of biocrust carbon emissions to disturbance. Our results demonstrate that disturbance significantly reduced biocrust coverage. The largest decreases were observed in the second through fourth intensity, which declined significantly by 12.6–17.1%. Disturbance decreased soil organic carbon content in the biocrust layer by 2.6 g kg−1–3.7 g kg−1depending on the disturbance intensity. Disturbance significantly increased the soil easily oxidizable carbon (SEOC) content in the biocrust layer. The soil microbial biomass carbon (SMBC) content of the fifth intensity increased significantly by 70.3%. The soil mineralizable carbon (SMC) content of the fourth intensity increased significantly by 78.8%. Soil carbon emissions increased significantly with increasing disturbance intensity, were higher at night than during the day, and were higher in the summer than in the fall. Together, these findings indicate that the increase of	See response to Comment Nos. EA-1 and EA-19.

Comment # / Commenter	Comment	Response
	carbon emission was mainly due to increases in SEOC and SMC. Trampling disturbance increases carbon emissions from biocrust soils. These losses of CO2from biocrust soils after disturbance may substantially reduce the biocrust contribution to the soil carbon budget.	
Comment #EA-45 Cyndi Tuell, Western Watersheds Project	Zobell, R.A., Cameron, A., Goodrich, S., Huber, A., Grandy, D., 2020. Ground Cover -What are the Critical Criteria and Why Does it Matter? Rangeland Ecology & Management, 2020 (in press), available at https://doi.org/10.1016/j.rama.2020.02.002 This publication is the result of concerns expressed regarding the definition and subsequent use of ground cover in rangeland monitoring. We reviewed 20 monitoring publications. All publications reviewed contained a definition of ground cover and/or direction on how to monitor ground cover. The majority of these publications also defined bare ground. In all cases, bare ground was defined as the opposite of ground cover. We identified critical criteria of ground cover based on the role it plays in soil conservation as it relates to water and wind erosion. Critical criteria identified included standing and non-standing live vegetation, standing and non-standing dead vegetation including litter, and rock. We compared these critical criteria to the 20 monitoring publications reviewed. We found 19 of these publications included the criteria standing live vegetation or similar words and standing dead vegetation or similar words in their definition and/or use of ground cover. The one source where standing live or dead vegetation or similar words were not included was "Indicators of Rangeland Health and Functionality in the Intermountain West." This publication was produced by the US Department of Agriculture, Forest Service, Rocky Mountain Research Station. Ground cover was limited to basal vegetation, litter, moss/lichen, or rock. We also found inconsistencies in the definition and subsequent use of ground cover in *Forest Service Handbook 2209.21–Rangeland Ecosystem Analysis and Monitoring Handbook, Intermountain Region.*	Rangeland monitoring practices are outside the scope of this EA. The literature provided discusses the long-term changes in desert ecological communities, land use plans and climate change, livestock grazing and its effect on vegetation and soils, all of which is outside the scope of this EA. Please see response to Comment Nos. EA-1, EA-18 and EA-19.

Comment # / Commenter	Comment	Response
	We contend a large volume of literature supports the inclusion of critical criteria as identified in this report as ground cover. These criteria are essential components contributing to resistance of water and wind erosion important to soil conservation. This review demonstrates the importance of accurately defining and subsequently including critical criteria in rangeland attributes including ground cover. This paper addresses standardizing terms and calculations used in determining ground cover. *See also:* Beymer, R. J., and J. M. Klopatek. 1992. Effects of grazing on biological soil crusts in pinyon- juniper wood- lands in Grand Canyon National Park. American Midland Naturalist 127:139-148. Bock, C. E., J. H. Bock, W. R. Kennedy, and V. M. Hawthorne. 1984. Responses of birds, rodents and vegetation to livestock exclosures in a semi-desert grassland site. Journal of Range Management 37:239–242. Bock, C. E., and J. H. Bock. 1993. Cover of perennial grasses in southeastern Arizona in relation to livestock grazing. Conservation Biology 7:371–377. Donahue, D. L. 1999. The Western Range Revisited: Removing livestock from public lands to conserve native biodiversity. University of Oklahoma Press, Norman OK. Fleischner, T. L. 1994. Ecological costs of livestock grazing in western North America. Conservation Biology 8:629-644.	
Comment #EA-46 Jeff Burgess	I have been following public land grazing management in Arizona for almost 30 years and I don't remember seeing a bigger boondoggle than this project. As the EA explains, this project would "install approximately 92 miles of pipeline, four water storage tanks,	See response to Comment No. EA-11

Comment # / Commenter	Comment	Response
	60 livestock watering troughs, and approximately 2.5 miles of fencing" on the Clayhole Allotment. The total cost would likely have to be disbursed to complete this project. The total cost would undoubtedly be in the 100s of thousands of dollars and could even exceed a million. And, as I pointed out in my previous scoping comments, this grazing permittee, the Heaton Cattle Co. LLC, has already received at least $482,499 in EQIP assistance since 2008. Significantly more government assistance would likely have to be disbursed to complete this project.	
Comment #EA-46 Jeff Burgess	The EA states that the project was initiated by "an external request." Who made that request?	As described in Section 1.1 of the EA, the grazing permittee along with the NRCS made the request for cooperative resource conservation, enhancement, and management objectives.
Comment #EA-46 Jeff Burgess	The EA also states that the project is needed because: "Water distribution within the 13 pastures is limited because most of the existing reservoirs are unreliable, dependent on rainfall events to refill, lack in water storage capabilities, and leak due to the inability of soils to retain water." Furthermore, it claims that, "The intention of the proposed project is not to increase permitted use (AUMs), but to encourage and achieve better livestock distribution within the allotment." But permitted use is usually far below actual use, especially in the desert Southwest. The EA shows that the allotment is permitted for 908 cattle yearlong. It fails, however, to mention the allotment's recent actual use. What was the annual actual livestock use of this allotment during the last 10 years? My strong suspicion is that actual use has been far below permitted use, and the proposed water developments are an attempt to be able to increase actual use towards the permitted use. In other words, they would allow more cattle to graze the allotment. And this would happen during an ongoing long-term drought, while climate change is making the region more arid.	Implementation of these proposed range improvements would not result in an increase in permitted use. Some years the actual use has been near the permitted use and some years significantly lower, however, the permittee still retains the preference to utilize all permitted AUMs as long as the use is within the 50% maximum utilization level. See also response to Comment Nos. EA-2, EA-10, EA-12 and EA-13. .

Comment # / Commenter	Comment	Response
Comment #EA-47 Jeff Burgess	The EA states that the water would be, "for both livestock and wildlife," and would provide "reliable year-round water sources." But it explains on page 7 that the proposed water system would be supplied by a mobile pump that would move between the available reservoirs and fill new water sites in different areas of the allotment. Then on page 31 it says that the project would provide "reliable sources of water at the appropriate times." This doesn't sound like the watering sites would be maintained yearlong for wildlife use. Will the permittee be specifically required to maintain ALL of the new watering sites yearlong for the benefit of local wildlife? If not, this would reduce any benefit the water might provide to the local wildlife populations. Moreover, if the new waters allow for increases in actual cattle numbers, any benefits they provide to the local wildlife could be offset by the negative effects impacts of the cattle on local habitat quality, including increased competition for forage.	When cattle are removed from a pasture, troughs would be left full of water and available to wildlife – please refer to Section 2.2 of the EA. The placement of the proposed water troughs would be a reliable water source that is not sporadically filled but available year-round. Water would be pumped into large storage tanks and once full, the tanks would supply water to the surrounding water troughs. The pump would not be necessary for water to flow from the tank to the adjacent water troughs. Livestock grazing on the Clayhole Allotment is permitted to use up to 50% of the available forage, with the remainder left for wildlife and for the ecological benefit of the vegetation. Implementation of the proposed project would not increase or decrease the permitted preference (expressed in AUMs). It would, however, improve livestock distribution which would result in more uniform utilization of forage by livestock. Better water distribution within the allotment would also improve wildlife habitat by reducing the distance animals travel to water and providing additional reliable water sources to areas of the allotment that are currently limited to stock tanks, which are often dry. This would meet habitat objectives concerning distribution of waters for both mule deer and pronghorn that are contained within the Arizona Strip Field Office RMP. The proposed project would also meet objectives within the *Arizona Strip Interdisciplinary Mule Deer Management Plan* (developed jointly by the BLM and AGFD) which states that "water distribution should be improved in [Units 12B, 13A, and 13B] by utilizing both cooperative projects and wildlife catchments," and within the *Arizona Statewide Pronghorn Management Plan* which identifies management objectives related to water availability.
Comment #EA-48 Jeff Burgess	For example, the typical diets of cattle and mule deer usually have minor overlap, because cattle prefer to graze herbaceous plants and the deer prefer to browse woody plants. But cattle have to eat a lot of brush to survive on Southwest desert grasslands. In fact, research has shown that grasses never comprise more than 50% of the forage consumed by cattle in the desert Southwest (Rosiere 1975), and that cattle are forced to rely on eating desert shrubs during the hot and dry summer months (Smith 1993). Subsequently, cattle compete with desert mule deer for browse forage on arid allotments during	The proposed project is within a grazing allotment that is available for livestock use and has a current and valid grazing permit. As stated above, utilization of up to 50% of current year's growth can occur on all parts of the allotment. The BLM is not proposing to increase or decrease the total number of AUMs for the Clayhole Allotment, nor does the proposed project affect the BLM's ability to work with the permittee to adjust livestock numbers in situations such as drought. During drought

Comment # / Commenter	Comment	Response
	the toughest times – the hot summers and droughts (Knipe 1977, Scott 1997, Severson 1983, Short 1977, Swank 1958), especially in the xeroriparian corridors (dry washes) preferred by the deer. The consumption of vegetation by cattle during dry times also negatively affects the deer habitat component of cover, especially for newborn fawns (Horejsi 1982). The bottom line is that new livestock waters can facilitate desert mule deer habitat degradation by helping to keep cattle on the land during dry times. And during the ongoing drought, we've seen that Arizona public land managers are more concerned about protecting private ranching enterprises by allowing cattle to stay on the land than they are worried about protecting publicly owned natural resources by requiring them to be removed. https://azgrazingclearinghouse.org/livestock-grazing-research/	years, the number of cattle grazed on the allotment are reduced to prevent them from adversely affecting vegetation resources.