Tassi Ranch Site Management Plan

Environmental Assessment

PEPC-79750

DOI-BLM-AZ-A030-2018-0006

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United States Department of the Interior
National Park Service
Bureau of Land Management
Grand Canyon-Parashant National Monument
345 East Riverside Drive
St. George, Utah 84790

Contents

Chapter 1

Purpose and Need for Action

1.1 Introduction

This EA has been prepared to disclose and analyze the environmental consequences of the proposed site management plan at Tassi Ranch and Springs. This analysis provides information as required by the National Park Service (NPS) implementing regulations for the National Environmental Policy Act (NEPA) and the National Park Service Organic Act to determine whether to authorize these treatments. This EA also serves as a tool to help the NPS Regional Director make an informed decision that is in conformance with the Grand Canyon-Parashant National Monument (PARA) General Management Plan/Resource Management Plan (GMP/RMP) (BLM 2008).

1.2 Background

Tassi Ranch and the associated springs is the most intact example of the historic vernacular landscape subset of cultural landscapes on PARA. It is considered historically "significant for its association with the historical development of cattle ranching in the remote, arid country of the Arizona Strip; and also because the ranch house and associated structures embody the distinctive characteristics of a type, period, and method of construction." (NPS 2013). As early as 1903, Tassi Springs has been claimed for use by sheep and cattle operations. The defined period of historical significance is 1936 to 1947, the period when Ed Yates built the majority of the existing buildings and ran cattle at the site (See Appendix C for images from that time – C-1, C-3, and C-5).

Since the 1980s, the National Park Service (NPS) has maintained the ranch structures and worked to stabilize the site. Since 2000, Tassi Ranch has been within the boundary of PARA, jointly managed by the NPS and Bureau of Land Management (BLM). Previous work at the site has been accomplished following a variety of plans, most notably the 2007 Tassi Ranch and Springs Interim Treatment Plan. Previous projects have included fence repair and stabilization (Tassi Ranch Fence Construction PEPC-17393), removal of non-historic grazing apparatus (Remove Abandoned Grazing Facilities and Rehabilitate Sites- Tassi Grazing Allotment PEPC-26819), invasive plant removal (Invasive Plant Management Plan PEPC-11501), structure repair (Stabilize Tassi Ranch Structures PEPC-25166), and native vegetation and aquatic habitat restoration (Restore Tassi Springs Native Vegetation and Rare Aquatic Animal Habitat PEPC-24556).

In 2013, the Tassi Ranch Cultural Landscape Report/Historic Structures Report (CLR) was finalized by NPS. This report provided a series of treatment recommendations to maintain the cultural landscape and historic structures while promoting visitor safety and preserving

biologically significant natural resources. PARA is directed to consider this report and implement the treatment recommendations to remain in compliance with national and local goals for historic areas.

1.3 Purpose and Need

The purpose of the proposed action is to implement recommended actions from the CLR, maintain viable habitat for the special status riparian and aquatic species in the project area, and provide sustainable visitor use.

The need for the proposed action is to protect the integrity of the cultural landscape, including historic structures, modern visitor infrastructure and historically appropriate vegetation.

1.4 Conformance with Land Use Plans

The proposed project area lies within lands managed under the Grand Canyon-Parashant National Monument General Management Plan/Resource Management Plan. The alternatives conform to decisions contained within this plan. Specifically, the alternatives are in conformance with the following decisions.

The following decisions are from Table 2.3 regarding Vegetation and Fire and Fuels Management, specifically "Tassi Ranch and Springs Restoration".

IMPL-RP-02: Components of the historic irrigation system will be maintained, allowing for preservation of Grand Wash Springsnail, an endemic species.

IMPL-RP-03: The spring will be considered for use as an introduction site for relict leopard frog.

IMPL-RP-04: The genetic integrity of cottonwood trees will continue to be maintained.

IMPL-RP-05: A site management plan for the spring, irrigation system, riparian area and ranch structures/historic landscape will be prepared to include:

- Conservation treatments for the historic building and irrigation structures;
- Vegetation management and spring restoration for ecological benefits including rare species conservation;
- Maintenance of the cultural landscape;
- Interpretation of the biological, hydrologic, and cultural features of the area, including visitor use management needs.

The following decisions are from Table 2.3 regarding Vegetation and Fire and Fuels Management.

DFC-VM-05: 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 and NPS Vital Signs and enhance Monument values.

DFC-RP-02: Riparian areas 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 Arizona Standards for Rangeland Health, NPS Vital Signs, and enhance Monument objects and values.

DFC-RP-03: Ecological functions and processes will be intact with vegetative species composition and cover appropriate to the site.

MA-RP-01 (in part): Habitat conditions at priority riparian areas will be maintained or improved.

MA-RP-02: The Riparian Ecological Zone will be managed for a mixture of herbaceous and woody vegetation in accordance with agencies' policies on native and non-native species.

DFC-VM-32: There will be no net loss of acres of Mohave Desert plant communities (i.e., long-term or permanent removal from the landscape). A no net loss objective will not preclude restoration, rehabilitation, or related management actions.

The following decisions are from Table 2.4 regarding Wildlife and Fish.

MA-WF-14 (in part): The following areas will be identified, nominated, and managed as Watchable Wildlife areas:

Tassi Spring

The following decisions are from Table 2.5 regarding Special Status Species.

MA-TE-05: The BLM and NPS will continue to cooperate with the USFWS to ensure specific actions comply with the ESA. The BLM and NPS will continue to undertake active management programs to inventory, monitor, restore, and maintain listed species habitats, control detrimental non-native species, control detrimental public access, and re-establish extirpated populations as necessary to maintain the species and their habitats.

MA-TE-30: Effects to desert tortoise from authorized projects will be minimized or eliminated. "Project" refer to any surface-disturbing activities proposed that may cause disturbance of desert tortoise habitat and/or death or injury of a desert tortoise, with the exception of grazing by livestock and activities associated with fire suppression.

To the extent possible, project activities will be scheduled when tortoises are inactive (October 15 through March 15). The following project activities will only be authorized between October 15 and March 15: organized, non-speed vehicular events; construction and non-emergency maintenance activities in ROWs; and non-emergency maintenance of existing roads. To the extent possible, project

features will be located in previously-disturbed areas or outside of desert tortoise habitat.

The following decisions are from Table 2.7 regarding Cultural Resources.

LA-CL-01: The following sites will continue to be managed for public use…. Tassi Ranch…

IMPL-CL-03 (in part): The following implementation actions will occur at Tassi Ranch and Springs:

- Components of the historic irrigation ditch system will be maintained to allow for preservation of Grand Wash Spring snail, an endemic species.
- The historic landscape will be managed so that it maintains historic and ecological integrity. (See Vegetation Management decisions.)
- The Tassi Ranch cultural landscape will be nominated for listing on the NRHP.
- A cyclic maintenance program will continue

The following decisions are from Table 2.14 regarding Recreation & Visitor Services/Interpretation & Environmental Education.

DFC-RR-15 (in part): The Parashant Wildlands RMZ will be managed…to produce recreation opportunities in the following essential settings

- Physical Benefits: Primitive to Roaded Natural, with regard to remoteness and naturalness and Primitive to Semi-Primitive Motorized, with regard to and recreation facilities.
- Administrative Benefits: Primitive to Semi-Primitive Motorized, with regard to visitor services, management controls and Primitive to Rural, with regard to mechanized/motorized use, with regard to mechanized/motorized use…

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

1.5 Relationship to Statutes, Regulations, or Other Plans

Numerous federal laws, regulations, and policies guide NPS management activities on public lands, with the most prominent laws being listed in this section. The Monument has prepared this EA for the Tassi Ranch Site Management Plan in compliance with NEPA and the NPS Organic Act.

The NPS Organic Act directs the NPS to manage units "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such a manner as will leave them unimpaired for the enjoyment of future generations." (16 U.S.C. § 1) The Organic Act prohibits actions that permanently impair park resources unless a law directly and specifically allows for the acts. An action constitutes an impairment when its impacts "harm

the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources and values." (Management Policies 1.4.3)

Congressional policy set forth by the National Historic Preservation Act of 1966, as amended (NHPA) (16 USC 470 et. sequential) (NHPA) includes preserving "the historical and cultural foundations of the Nation" and preserving irreplaceable examples important to our national heritage to maintain "cultural, educational, aesthetic, inspirational, economic and energy benefits."

The Secretary of the Interior's Standards for the Treatment of Historic Properties, revised in 1992, (36 CFR Part 68) provides guidance to cultural resources owners, stewards and managers, landscape architects, preservation planners and others prior to the during the planning and implementation of project work on cultural resources.

The Proposed Action is predicated on and consistent with guidance provided in NPS Director's Order 28: Cultural Resource Management Guideline. The guidelines require that the NPS manage cultural resources in its custody through effective research, planning, and stewardship. Included in Directors Orders (DO)-28 is the requirement to consult with Tribes about any project that might have interest including ethnographic resources identified as any, "site, substance, object landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it".

NPS Management Policies 2006 include direction for preserving and protecting cultural resources, natural resources, processes, systems, and values (NPS 2006). It is the goal of the NPS to avoid or minimize potential impacts to resources to the greatest extent practicable consistent with the management policies.

Tassi Spring is a current relict leopard frog population expansion site. The Proposed Action complies with the 2016 Conservation Agreement and Conservation Assessment and Strategy for the Relict Leopard Frog (Rana onca [=Lithobates onca]) to conserve, manage, and expand populations of relict leopard frogs within a diversity of habitats and localities that reflect areas of the known historical range.

The project area is in Mohave County, Arizona. The alternatives are consistent with the Mohave County General Plan (adopted in 1994 and revised December 5, 2005). While the Tassi Ranch cultural landscape is not specifically addressed in the Mohave County General Plan, this action does not conflict with decisions contained within the Plan.

In addition, the alternatives would comply with the following laws and/or agency regulations, and other plans, and are consistent with applicable federal, state, and local laws, regulations, and plans to the maximum extent possible.

- The Archeological Resources Protection Act of 1979 (PL 96-95, 93 Stat. 712, 16 USC Section 470aa et seq. and 43 CFR 7, subparts A and B, 36 CFR)
- Clean Air Act of 1970 (42 U.S.C. 7401 et seq.)
- Endangered Species Act of 1973, as amended
- Executive Order 13186 Responsibilities of Federal Agencies To Protect Migratory Birds
- Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755), as amended
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001–3013; 104 Stat. 3048-3058)

1.6 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.

Cultural resources: Implementation of either alternative may affect different types of cultural resources; e.g., archeological resources, historic structures and cultural landscapes

Recreation: Implementation of either alternative may affect recreational use of the cultural landscape

Soils: Implementation of either alternative may affect soil density and chemistry

Vegetation: Implementation of either alternative may increase disturbance to wetland, riparian and upland vegetation

Visual Resources: Implementation of the proposed action may affect the appearance of the project area

Wildlife (including threatened and endangered species, special status species and migratory birds): Implementation of either alternative may affect the use of the project area by animals

Chapter 2

Proposed Action and 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. Three additional alternatives were considered, but eliminated from further analysis. They are described in Section 2.3 along with rationale for not being further considered.

2.2. Description of the Alternatives

2.2.1 Alternative A – Proposed Action

Alternative A, the Proposed Action, has been developed to attain the specific management goals outlined in the PARA GMP/RMP. The CLR developed by the NPS Pacific West Region Cultural Resources Program is the primary guidance for site management at Tassi Ranch. A detailed description of each component of the historic landscape, including current deficiencies, recommended treatment and goals, can be found in Appendix B. Three historic images used to inform the CLR are found in Appendix C. A discussion of the points of departure from the CLR recommendations found in Alternative A can be found in Appendix F.

Historic Structures and Landscape Elements

Historic Structures (HS) and Landscape Elements (LE) have been derived from the CLR. HS and LE, collectively known as Contributing Elements (CE) are defined as components of the historic landscape that are integral to the desired look and feel of the site from a historical perspective as determined during the NPS cultural landscape documentation process. The HS include a ranch house, shed, barn, spring boxes, stock tank, lambing pen, and fence/corral system. The LE include fields, irrigation ditches, holding ponds, ranch yard, ranch road, and a row of nine cottonwood trees along the front ranch core fence. See Map A-1.

Annually, the HS would be inspected and/or repaired. Repairs may include replacement of damaged or non-functioning components such as roofs, screens, fence posts and doors. Repairs would follow the Secretary of the Interior's Standards for the Treatment of Historic Properties. Materials would include wood, metal, concrete, stone, plastic, canvas or other cloth, glass, and mortar. Repairs may, however, also include non-historic elements if 1) the historically appropriate materials would present a danger to the public or 2) the non-historic elements provide a similar visitor experience while not decreasing the historical value of the site. An example of this would be placing open wire mesh behind the existing screens and door of the ranch house to prevent visitors from accessing a potentially unstable building that may contain hantavirus while allowing them to clearly seen inside the front room.

Debris would be removed from in and around the HS and the LE. Debris would be defined as non-functional components of the HS (i.e. historic fabric or components that are beyond repair, or materials that have already replaced in-kind), LE or modern infrastructure, vegetation (unless otherwise determined to be useful at that location such as mulch), and items that have accumulated at the site that have not been defined as part of the HS or LE such as carpeting inside the ranch house. Once organic and vegetative debris and non-historic debris were removed, an appropriate cultural resources professional (such as archeologist, historical architect or historical landscape architect) would then determine if any of the non-functional components of the HS and LE need to be mapped or collected for preservation before removal. Debris would be removed using several methods including hand removal, shoveling, cutting or raking. Debris would be disposed of as appropriate, for example woody debris would be hauled to Pigeon Wash and chipped and/or burned while metal and plastic debris would be hauled to a municipal waste system.

Springbrook

The springbrook, a functioning section of the irrigation ditch, may be extended approximately 266 feet to a new breach in the existing dry non-functional section of the irrigation ditch (see Map A-2). This would result in a new breach across the ranch road and a new water flow that would connect with the wash approximately 200 feet further down the wash than the current breach flow. Stabilization of the springbrook and the new functioning section of the irrigation ditch would include removal of vegetation and substrate from the ditch and may include the addition of wood, stone, metal or concrete to prevent the ditch from breaching in an undesired location or being filled in by natural earth movement from the uphill side of the ditch. If these stabilizing elements are necessary, they would be designed to be unobtrusive and in keeping with the historic look of the site, for instance the visible sections would be primarily wood or stone but the hidden sections may incorporate concrete or landscape fabric.

Fence and Corral System

The fence and corral system would be maintained and repaired as needed. In general, the fence would be replaced with in-kind materials; however, sections where new barbed and smooth wire would be hung would conform to Manual H-1741-1 - BLM Fencing for Wildlife-Friendly Fencing Standards and the Arizona Department of Game and Fish (AGFD) Guidelines for Wildlife Compatible Fencing. The portion of the fence system (ranch core fence) around the HS already incorporates several modern modifications and will be discussed further in the “Modern Infrastructure” section below.

Ranch Yard

In addition to debris removal, the ranch yard would be re-contoured to remove the buildup of organic matter and soil from various modern projects including the placement of French drains in the 2000s, recent flooding with resulting silt deposition, most notably in 2014, and natural vegetative decay, i.e. buildup of dormant and dead layers of grass and leaves. (See “Modern

Infrastructure" below and Appendix F for a discussion of changes to the visitor use infrastructure due to the flooding event). This buildup is causing water to pool intermittently around the structures instead of flowing toward the wash. The re-contouring would remove the modern accumulation of debris and decrease the buildup of water around and in the HS and better conform to the original cleared nature of the ranch yard as seen in images from 1947 (Appendix C). Re-contouring would be accomplished with heavy equipment such as a backhoe and hand tools such as shovels and rakes. Re-contouring would take place under the supervision of an archeologist or their designee. The overall slope of the ranch yard would not exceed 2% and would generally slope toward the wash.

Vegetation that has been determined to be a LE would be pruned by a certified arborist or under the guidance of a technical expert during the dormant season (see Map A-1). Dead or dying LE would be identified by a certified arborist and replaced with like vegetation from seedlings, suckers or rooted cuttings found onsite unless a close match can be found from a similar spring-system area. The dead or dying LE would preferentially be removed during the dormant season; however replacement timing would depend on the species' requirements, visitor safety and threat to structures. Temporary watering structures may need to be used to ensure successful establishment of new vegetation.

Vegetation

Annually encroaching vegetation would be removed from the walkways, HS, LE (including agricultural fields) and parking areas (see Maps A-2 and A-3). Vegetation would also be maintained to provide 1) open space around the ranch house, shed and barn to provide a fire barrier and to mimic the previously open ranch yard, 2) an open vista of the adjacent Pigeon and Tassi Wash as historic photos indicate occurred during the period of cultural significance, and 3) open preexisting roads for the passage of service vehicles and the use to roads as visitor trails.

Vegetation, including invasive and non-native species, would be treated by a variety of methods. Treatment may include mechanical methods (trimmer, brush hog, weed wacker, chainsaw, and/or backhoe) or manual manipulation (hand pulling, brush blade, and/or lopper). Treatments may also incorporate the application of pesticides (including fungicides and herbicides). Only EPA approved pesticides would be used according to label to control unwanted vegetation. Some common herbicide compounds may include the following active ingredients: Triclopyr, Imazapyr, Glyphosate, 2,4-D, and other approved compounds.

Woody debris would be hauled to Pigeon Wash and chipped or burned. Non-woody debris such as leaves would either be added to the woody debris pile or used as mulch to stabilize existing vegetation or LE.

Vegetation treatment in the riparian areas would be guided by the requirements of the aquatic organisms found at the particular location. No more than 33% of the upper springbrook area would have vegetation removed in any one year timeframe to preserve habitat for the Grand

Wash springsnail. In the lower sections of the stream in Pigeon Wash, vegetation would be maintained to provide adequate shading to protect the speckled dace found in that stretch. Non-emergency vegetation treatment would also not occur in the springbrook or wherever relict leopard frog egg masses or tadpoles are found during January through April and November. Prior to riparian vegetation removal, recent springsnail and relict leopard surveys would be analyzed and additional surveys would be carried out to provide any missing current data for the springbrook, and near and in spring box #1.

Modern Infrastructure

Modern Infrastructure is defined as additions to the historic landscape for visitor use or interpretation, scientific monitoring and site stabilization and protection.

Parking Area

The parking area is currently approximately the size and location recommended in the CLR due to safety concerns about hazardous cottonwood trees. This area would be expanded to meet the CLR recommendations (i.e. allowing vehicles near the fenceline) once hazards have been diminished or removed.

This may include additional use or removal of substrate material (i.e. flood deposits gravel on parking area, raising the level) including gravel, boulders and silt. Substrate to be added to the parking area would be preferentially taken from the contiguous Wash. Substrate material removed from the parking area would be deposited in Pigeon Wash or may be used to repair NPS Road 1213 where it crosses Pigeon Wash next to Tassi Ranch.

Pigeon Wash Contouring

To minimize potential flood damage to the parking area and ranch core, contouring of Pigeon Wash may occur to shift the active flood channel away from the site. This shift would move the center of the primary flood channel within Pigeon Wash further from the ranch core while not substantially changing the appearance of Pigeon Wash. This would be done in consultation with the Army Corps of Engineers and a technical expert.

Historic Structures and Landscape Elements Stabilization

Some modern infrastructure may be added to the site to help stabilize the HS and LE. Pea gravel and/or geotextile fabric would be added to the floors of the ranch house, barn and shed to aid in water drainage. Wooden or metal bracing may be added to the HS to stabilize the existing structures. Different formulations of concrete, from those original to the site, may be used to aid in preservation. Any modifications to the original HS or LE would be documented and marked if appropriate (such as stamping new timbers). Short footbridges may be placed to keep visitors from walking in the springbrook or muddy areas. Bridges would not be permanent features and would be placed only on an as-needed basis. The bridges would be constructed of wood, or other composite material, and metal and would be designed to be unobtrusive. The current French

drain system would be inspected, cleaned out and augmented to increase the diversion of water away from the ranch house, shed, and barn. This would include the use of plastic drain pipe, gravel and filter fabric and heavy equipment such as a backhoe.

Visitor Infrastructure

Modifications and additions would be made to the existing visitor-related infrastructure. The visitor register would be removed from its current location and reinstalled in the parking area. Wayside exhibits would be replaced, most likely in the same or nearby locations, and would meet accessibility standards. An additional wayside would be placed on the bluff across Pigeon Wash adjacent to the closed airstrip to provide educational information from the viewpoint where the entire ranch is visible. Depending on location and other signage along access roads, information not specific to the site may be included on Tassi Ranch waysides such as “Leave No Trace”, invasive plants, desert tortoise, FAQs, and/or Monument safety messaging.

The ranch core fence is a mix of barbed wire and wooden worm fencing. The barbed wire fence portion is part of the HS but has had additional wire added to it to strengthen the fence to protect the ranch house, shed, barn and springbrook from damage by feral cattle, burros and horses. This fence would be maintained with barbed wire, metal t-posts and cedar posts; however, new gates would be placed to allow access for service vehicles (See Appendix D for illustrative of gate design). Gates would be metal or wood with some parts that may be plastic or composite. Gates would be functional but also compatible with the historic character of the ranch.

The wooden worm fence , added in 1998 to complete the ranch core fence, would be replaced with a different fence design similar to split rail, still primarily wood, but more in keeping with the historic character of the site and would be similar to the fence seen in an image from 1947. This fence would be designed to exclude feral cattle, burros and horses. The fence would incorporate a locked service vehicle gate similar to the gates in the barbed wire section but appear to be historically appropriate (i.e. incorporating at least some wooden elements, if not primarily wooden) and a visitor pass through gate that would allow foot traffic but exclude motorized vehicles.

Two stiles would provide access for visitors through barbed wire sections of the fence. One would be moved out of the historic roadway to allow for the placement of one of the service gates. The stiles may also be replaced with a different design with a smaller footprint.

A vault toilet would be installed near the wayside on the bluff across Pigeon Wash in the footprint of the closed airstrip. The vault toilet location would help hide the structure from casual observers at Tassi Ranch. Standard environmental colors would be selected to minimize visual contrast at the structure. Signage indicating its location may be placed in the parking area or immediately adjacent to the eastern side of the ranch core near NPS Road 1213.

Scientific Monitoring

Ongoing monitoring at the site would continue. Activities previously approved include long-term monitoring of the relict leopard frog population under the Relict Leopard Frog Conservation Agreement (Implementation of Conservation Actions for the Relict Leopard Frog Research Permit DOI-BLM-AZ-A030-2015-0006-CX), long term monitoring of the water quality and quantity, Grand Wash springsnails, and benthic macroinvertebrates in conjunction with the Mojave Desert Inventory and Monitoring Network (MOJN) (Mojave Desert Inventory and Monitoring Network Selected Large Springs Research Permit DOI-BLM-AZ-A030-2015-0002-CX), springsnail and speckled dace surveys in conjunction with AGFD (Springsnail and native fish survey of springs in the Grand Wash and Whitney Ranch areas DOI-BLM-AZ-A030-2017-0003-CX) and acoustic monitoring of bats (Bat survey for population and microbial studies DOI-BLM-AZ-A030-2017-0005-CX).

In addition to the ongoing monitoring, surveys would occur within 1 year prior to any NPS or BLM controlled changes in water flow (such as lengthening the springbrook) for Grand Wash springsnail, including the area around the previously unsurveyed spring box #1.

To monitor subsurface spring activity, including spring migration and changes in the Tassi Springs complex, up to 10 shallow wells, with 2-inch PVC casing, 15 feet deep, with a 2-foot screen would be placed using a hand auger. Wells would be located within 200-feet of current springhead locations. Borehole tillings would be produced (approximately 8 cubic feet per well) and would be dispersed near each well to minimize the appearance of artificial mounds. Maximum water removed annually would be 7.5 gallons per well. Water would be dispersed on the surface near each well head. The PVC casing would most likely be replaced every 20-30 years.

A brook size weir/flume and vault to house a datalogger to gauge water flow rates would be placed in the stream channel downstream from the main spring heads which form a perennial outflow to monitor flow rates and provide a location for ongoing water quality testing. The weir would be approximately 10 feet square. The weir/flume would include a surrounding concrete slab (see Appendix D for schematic with dimensions and picture of example). The flume would be used by several entities including MOJN and PARA staff, and other cooperators. Approximately 1 gallon of water per year may be removed from the site for testing.

A scientific monitoring station would be placed on an embankment near open/flowing water to monitor bats attracted to the water source. The proposed instrumentation may include: anemometer, temperature, relative humidity, barometer, precipitation gauge, UV solar intensity, evaporation pans, soundscape/wildlife acoustic equipment, and air quality monitoring equipment for ozone, nitrate/sulfate deposition, haze, and air particulates. The scientific monitoring station at its largest extent would include two 100-watt solar panels on 3-foot wide stands, and 26-foot tall tripods, each anchored via weighted footing. Total area needed would encompass an area no greater than 110 square feet. All efforts would be made to reduce the visibility of the station,

including non-reflective surfaces and camouflage-type paint on instrument surfaces. The specific locations would incorporate visual resource management considerations so that topography and vegetation would screen the equipment as much as possible.

The existing exclosure installed by Lake Mead National Recreation Area (LAKE) in 1993 would be temporarily retained until a decision could be made regarding its scientific need. LAKE natural resources staff has requested it remain as it represents a rare maintained exclosure in the Mojave Desert and MOJN staff is considering adding it to their long-term monitoring of the nearby spring. Further review of the need for the exclosure and what data has been collected would occur with NPS Regional Cultural Resource Advisors and local staff prior to a final decision regarding its status.

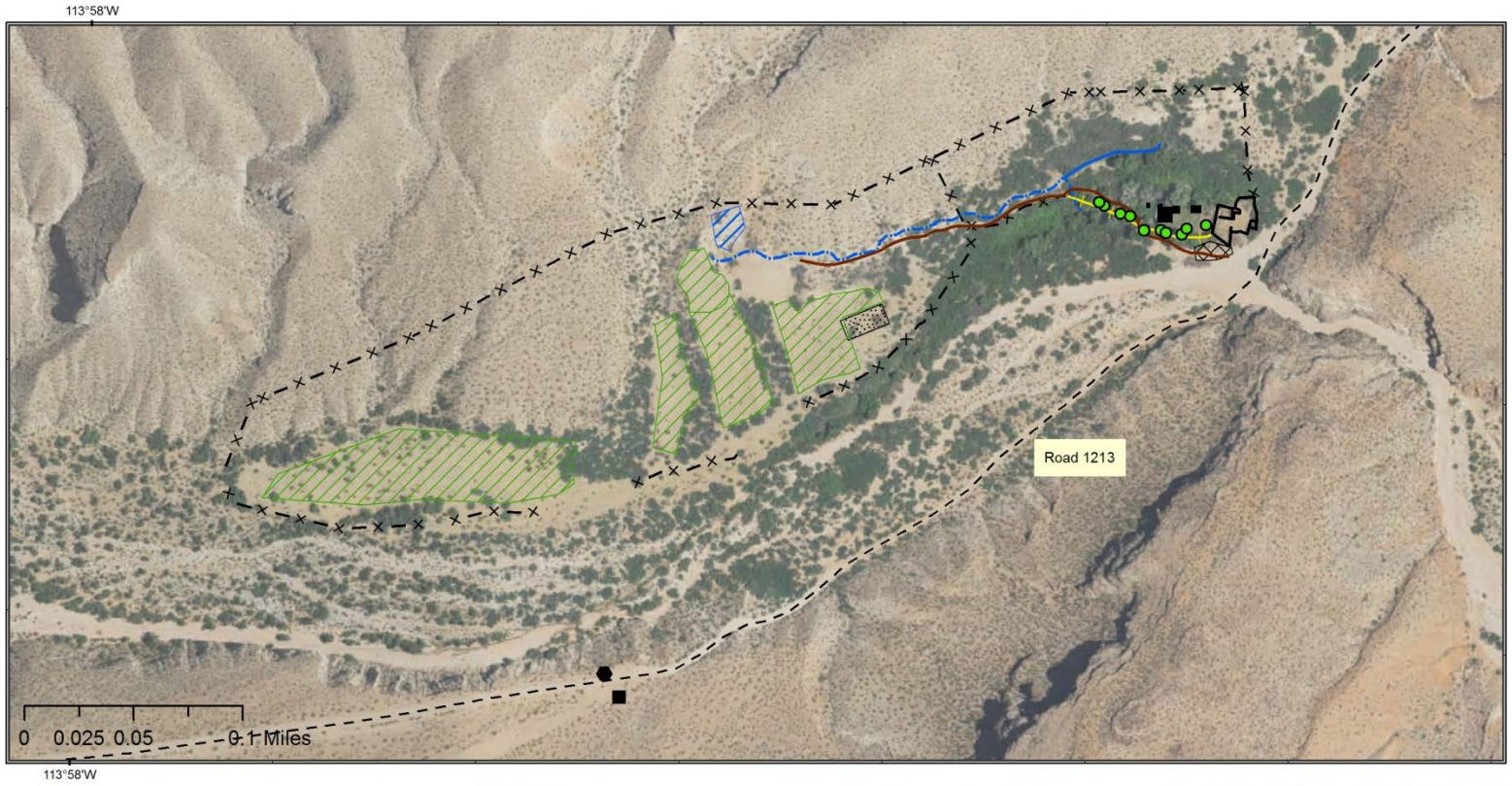
Access

Access to the individual project areas would be by way of existing designated routes using standard ½ to 1 ton trucks, and/or ATVs or UTVs.

Location:

The proposed project area is Tassi Ranch and Springs, Mohave County, Arizona within PARA. The project area is within T. 33 N., R. 16 W., sec. 13, Gila and Salt River Meridian, Arizona. See Map 2-1 below.

Map 2-1. Tassi Ranch Site Management Plan Site Overview
NEPA Number PEPC-79750/DOI-BLM-AZ-A030-2018-0006
Department of the Interior - National Park Service - Grand Canyon-Parashant National Monument



NPS Road

Modern
- Modern Fence
- Breach Flow To Wash
- Parking Area
- Vegetation Exclosure
- Proposed New Interpretive Sign
- Proposed Public Toilet

Historic
- Dry Pond
- Buildings
- Corral
- Ditch/Springbrook
- Dry Ditch
- Agricultural Fields
- Historic Fence
- Main Ranch Road
- Cottonwood Tree

Map Produced by BLM Arizona Strip District
File: TassiEA_OverviewMap_20180917.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 1:4,343 at 8.5x11 page output
User: jefox
Date: 9/17/2018

No warranty is made by the Bureau of Land Management (BLM) regarding the accuracy or completeness of this map. This map is representational and is to be used as intended by the BLM. Map data compiled from various sources. This map and the data from which it was derived are not binding on the BLM and may be revised at any time.

Design Features

The following design features (DFs) are included in the Proposed Action to minimize potential environmental impacts.

- Vegetation treatments that are not necessary for emergency site stabilization, i.e. the water is no longer flowing in the springbrook, or the removal of small amounts of vegetation would not occur during avian nesting season.
- To avoid possible effects to relict leopard frog and Grand Wash springsnail, coordination with AGFD would occur prior to non-emergency or major vegetation removal in riparian or wetland area (i.e. more than trimming vegetation in walkways).
- Salvage and within springbrook relocation of springsnails and all lifestages of relict leopard frogs may occur if vegetation removal would result in ground disturbance within their aquatic habitat or exposure to greater sunlight levels. Salvage would consist of removal of springsnails and relict leopard frogs (including egg masses and tadpoles) from the affected area and placement in an unaffected area, preferably with similar vegetative cover and water flow.
- Construction would be limited to daylight hours to minimize impacts to wildlife.
- Construction activities would be limited to periods when the soil surface is dry except when construction is needed in riparian areas or areas where water is being drained.
- Disturbance to existing historic vegetation (LE) would be avoided except when vegetation disturbance is necessary for human health and safety or for maintaining the integrity of the cultural landscape.
- 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 and disposed of in an authorized disposal site, using best available practices required by law. All spills of federally or state listed hazardous materials which exceed the reportable quantities would be promptly reported to the appropriate agency and the authorized officer.
- Vehicles and equipment would be power washed off-site before construction activities begin to minimize the risk of spreading noxious weeds. This would include cleaning all equipment before entering the Arizona Strip. The project areas would be monitored by the BLM for noxious weeds for two years following completion of the project and would be treated as needed.
- The project sites would be cleaned up at the end of each work day (e.g., trash removed, scrap materials picked up). “Waste” means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment.
- Any cultural (historic/prehistoric site or object) or paleontological resource (fossil remains of plants or animals) discovered within the project areas that has not be

determined to be previously documented and noted during project planning would immediately be reported to the PARA Manager and the PARA archeologist or their 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 archeologist or paleontologist to determine appropriate actions to prevent the loss of scientifically significant cultural or paleontological values.

- If any human remains, funerary objects, sacred objects, or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (Public Law 101-601; 104 Stat. 3048; 25 U.S.C. 3001) are discovered, operations in the immediate area of the discovery would stop, the remains and objects would be protected, and the PARA Manager (or designee) and the PARA archeologist would be immediately notified. The immediate area of the discovery would be protected until notified by the PARA Manager (or designee) that operations may resume.
- No hazing or harassment of wildlife is permitted.

Conservation Measures, Terms and Conditions - Desert Tortoise

The following conservation measures are contained in United States Fish and Wildlife Service (USFWS) Biological Opinion 22410-2007-F-0463 (2007), and incorporated into this project.

1. Designate a field contact representative (FCR) who will have the authority to halt all non-emergency project activity should any danger to a listed species arise. Work will only resume after hazards to the listed species are removed.
2. Authorized biologists will act as biological monitors and be present during all construction activities for the protection of desert tortoises and other listed species. These biological monitors will be responsible for determining compliance with measures as defined in the biological opinion or other agreements between the project proponent and agencies.
3. Authorized activities will require monitoring of the desert tortoise population throughout the duration of the project. The appropriate level of monitoring will be developed in coordination with BLM and USFWS. To ensure desired results are being achieved, minimization measures will be evaluated and, if necessary, section 7 consultation reinitiated.
4. Within DWMAs/ACECs during the tortoise active season (March 15-October 15), set a 20 mph speed limit on BLM roads.
5. Limit new access routes created by the project.
6. Uncontrolled domestic dogs will be prohibited from the project site and site access routes. Use of firearms, except by law enforcement officers or licensed hunters during lawful hunting activities will also be prohibited.
7. No standing water as a result of project operations will be permitted.

In addition,

1. The areas of the project where ground disturbance would occur within tortoise habitat would be surveyed prior to ground disturbance to ensure no tortoise or tortoise burrows are within the project boundaries.
2. No handling of tortoises would occur. If a tortoise is found during project activities it would not be disturbed and activities would be modified until the tortoise leaves the area on its own.

Conservation Measures, Terms and Conditions – California Condor

The following conservation measures are contained in USFWS Memorandum 02EAAZ00-2016-CPA-0038 (2016), and incorporated into this project.

1. If a condor occurs at the construction site, construction activities that could result in injury to condors should cease until the condor leaves on its own or until techniques are employed by permitted personnel that result in the condor leaving the area.
2. Construction worker and supervisors should be instructed to avoid interaction with condors and to immediately contact the Flagstaff office of the U.S. Fish and Wildlife Service (FWS) or The Peregrine Fund personnel if condor(s) occur at a construction site. Non-permitted personnel cannot haze or otherwise interact with condors.
3. The construction site should be cleaned up (e.g., trash removed, scrap materials picked up) at the end of each day that work is being conducted to minimize the likelihood of condors visiting the site.

2.2.2 Alternative B – No Action

Under the No Action Alternative, no additional management actions would be taken beyond those identified in the GMP/RMP or in previous environmental compliance documents, or specifically required by law or policy. The historic structures, vegetation and visitor facilities would be maintained in a piecemeal fashion and maintenance would be confined to the ranch core and fences.

2.3 Alternatives Considered but Eliminated from Detailed Analysis

NEPA requires federal agencies to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Alternatives not considered in detail in an EA may include, but are not limited to, those that fail to meet the purpose and need; are technologically infeasible or illegal; are inconsistent with basic policy objectives (such as not in conformance with the GMP/RMP); are substantially similar in design to an alternative that is analyzed; or would have substantially similar effects to an alternative that is analyzed.

2.3.1 Abandonment of Site to Natural Forces

Allowing the site to continue its natural trajectory toward an unaltered Mojave Desert ecosystem was considered. This would include allowing all historic structures to degrade and all landscape

elements to return to an unmodified state. Under the Secretary of the Interior's Standards for the Treatment of Historic Properties, once a cultural landscape has been defined "[w]here a treatment and use have not been identified, a property will be protected and, if necessary, stabilized until additional work may be undertaken" (NPS 1996). Since the site has been determined to be a cultural landscape with National Register of Historic Places eligible elements, the site must be protected and stabilized until the plan is finalized.

2.3.2 Restriction of Site Upkeep and Modification to Ranch Core

Only maintaining the cultural landscape in the ranch core area was considered. This would have limited upkeep and modern infrastructure to the ranch core area and allowed the agricultural fields to revert to an unaltered Mojave Desert ecosystem. The agricultural fields have been determined in the CLR to be contributing elements to the historic and cultural landscape. In accordance with Secretary of the Interior's Standards for the Treatment of Historic Properties, "[t]he historic character of a property will be retained and preserved" (NPS 1996). As such, the agricultural fields must be maintained to provide historic context for the ranch core.

2.3.3 Prioritization of Restoration of Natural Features over Restoration of Cultural Features

An alternative to prioritize restoration of natural features and wildlife habitat over cultural or historical features in cases of conflict between the two resources was considered with an emphasis on restoration of "natural" water flow patterns. This is similar to the alternative discussed in 2.3.1 but includes the idea of active restoration and would also be incorporated into the site management plan. In one view, the active maintenance and restoration of the site would be in conflict with natural resources. Alternately, individual components of the site could be considered individually to determine the level of conflict. The Secretary of the Interior's Standards for the Treatment of Historic Properties (NPS 1996) specifically recommends against

> Making environmental protection related modifications that do not provide a reasonable balance between improved environmental conditions and the preservation of historic features, materials and finishes.

Unfortunately the configuration of Tassi Ranch makes this extremely difficult. Firstly, the main historic structures are directly downhill from the spring heads, and natural flow would most likely be directly into the backs of the structures. Secondly, the resulting "natural" flow would in itself need to be carefully engineered to bring the new flow to actually reach the wash to join with the existing flow so as to not kill off the speckled dace in the wash. In general, an environmental protection regulation would need to be invoked to even consider restoration or prioritization of purely natural features over cultural features, and even then the standards recommend not

> Altering damaging or destroying character-defining features, materials and finishes while making modifications to a cultural landscape to comply with environmental protection regulations. (NPS 1996)

With this guidance, the recognized cultural landscape cannot be managed to prioritize restoration of natural features over that of cultural features without a clear legal mandate to do so.

Chapter 3

Affected Environment

3.1 Introduction

Elements of the human environment that are subject to requirements specified in statute, regulation, or executive order and must be considered in all EAs and other area-relevant resources have been considered by an interdisciplinary team of NPS and BLM resource specialists to determine whether they would be potentially affected by the Proposed Action or alternatives. The resources identified and discussed in Section 3.4 include the relevant physical, social, and biological conditions that may be impacted with implementation of one of the alternatives, and provides the baseline for comparing impacts described in Chapter 4.

3.2 General Setting

Tassi Ranch is a defined cultural landscape incorporating Tassi Springs. It is located at the junction of Pigeon and Tassi washes in the Mojave Desert and accessed by NPS Road 1213 approximately three air miles south of the PARA internal NPS-BLM boundary. The cultural landscape is composed of a fenced area that encompasses a human-modified landscape. Adjacent to the defined cultural landscape is relatively unaltered, but historically grazed, typical Mojave Desert uplands.

3.3 Elements or Resources of the Human Environment

Table 3.1 addresses the elements and resources of concern considered in the development of this EA; this table indicates whether the element or resource is not present in the project area, present but not impacted to a degree that requires detailed analysis, or present and potentially impacted.

Table 3.1 Elements or resources of the human environment

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

Resource	Determination	Rationale for Determination
Air Resources (including air quality, night skies, and greenhouse gas emissions)	NI	The primary factors effecting air quality would stem from the quantity of disturbed soil surface area (fugitive dust), along with the quantities of emissions from vehicles, to include types, and vehicle usage in the Proposed Action. Overall, fugitive dust would be minimal and short term, as the proposed construction activity would involve vehicles which typically operate for limited durations. The disturbed soil surfaces would consist of mostly gravel-to-cobble alluvial deposits and damp soils reducing the amount of fugitive dust. 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 (ACEC)	NP	PARA does not contain any ACECs as per the 2008 GMP/RMP and 2000 Monument Proclamation.
Areas Managed to Maintain Wilderness Characteristics	NP	Based on a GIS review, there are no Areas Managed to Maintain Wilderness Characteristics adjacent to or within the project area.
Cultural Resources	PI	Both alternatives may impact archeological resources, historic structures and the cultural landscape. This issue will therefore be analyzed in greater detail below. Recent ethnographic overviews and studies have not identified the southern Grand Wash Cliffs area near Tassi, nor Tassi Springs, as important. Current Consultation is underway.
Farmlands (Prime or Unique)	NP	There are no prime or unique farmlands within or adjacent to the project area based on a review of the USDA Soil Survey.
Floodplains	NI	The location of the project site is adjacent to a flood plain, with proposed development to further define the existing parking space which is situated on an alluvial floodplain. Design features allow

Resource	Determination	Rationale for Determination
		for natural erosion processes to occur on this floodplain, with no impact considering surface water runoff during episodic seasonal flood events.
Fuels / Fire Management	NI	A decrease in the fuel loading would mitigate fire suppression issues.
Geology / Mineral Resources / Energy Production	NI	PARA is closed to new mineral claims and energy production as per the 2000 Monument Proclamation. No existing claims are in the project area.
Invasive, Non-native Animal Species	NP	No non-native or invasive animal species are known from Tassi Ranch other than wild burros. Burros will be considered under the heading "Wild Horses and Burros" in this table.
Lands / Access	NI	Access to public lands would not be altered or impaired by implementation of the alternatives. No other issues have been identified in connection with the alternatives.
Livestock Grazing	NP	The proposed project area is within the NPS portion of the Tassi Allotment (AZ04851). LA-GM-04 " The Tassi Allotment described in the 1998 LUP Amendment will continue to be unavailable for grazing. By administrative action at the same time, that portion of the Tassi Allotment on NPS-administered lands was made unavailable in perpetuity for grazing." (GMP/RMP 2008)
Native American Religious Concerns	NI	Based on the prepared EA and tribal consultations, this project would not "limit access to any ceremonial use or to any Indian sacred sites on federal lands by American Indian tribes who have interest on the AZ strip".
Paleontology	NI	While common variety marine invertebrate fossils and micro-fossils are easily found in much of the adjacent Late Permian Kaibab Limestone geologic strata near the project site, significant paleontological resources are not present.
Recreation	PI	The proposed activities could impact recreation

Resource	Determination	Rationale for Determination
		due to improvements to parking areas, fencing, registers, and wayside exhibits. These impacts to recreation will be analyzed in further detail.
Socioeconomic Values	NI	The economic base for PARA is mainly ranching and tourism. The social aspect generally involves a remote, unpopulated setting with moderate to high opportunities for solitude. The project area is not within close proximity to the growing communities. The project therefore would have little impact on those economies or social aspects of the region.
Soil Resources	PI	The proposed activities are likely to impact soils through ground disturbance largely due to installation of drains and ditches, addition of a vault toilet, and alterations to the parking lot surface. This will be analyzed in further detail.
Threatened, Endangered, and Candidate Animal Species	NI	Two species are identified in this area, Mojave desert tortoise and California condor. The project area is within critical habitat (Northeastern Mojave Recovery Unit) of the desert tortoise and the nonessential experimental population area in northern Arizona and southern Utah of the condor. Conservation measures included in the Proposed Action for these two species would prevent impacts to individuals. Also, the Proposed Action would not modify tortoise habitat.
Threatened, Endangered, and Candidate Plant Species	NP	No Threatened, Endangered, or Candidate Plant Species occur in the project area.
Vegetation, Including Noxious Weeds and Invasive, Non-native Species	PI	The proposed vegetation treatments may impact the location's specific vegetation types, including where invasive species would be found. This will be analyzed in further detail.
Visual Resources	PI	The proposed vegetation treatments and construction projects with the parking area and fencing could impact the lines, and densities of colors in the project area. This will be analyzed in further detail.
Wastes	NI	Hazardous Waste: No chemicals subject to reporting under SARA Title III in an amount

Resource	Determination	Rationale for Determination
(hazardous or solid)		equal to or greater than 10,000 pounds would be used, produced, stored, transported, or disposed of annually in association with the project. 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 the project. Solid Wastes: Any trash produced as a result of the Proposed Action would be confined in a covered container and hauled to an approved landfill.
Water Quality (drinking / ground)	NI	The proposed activities, which would occur solely at the specified project area, would need to consider water quality along with quantities. The Proposed Action would have no impact on total amounts of spring head discharge as there would be no alteration in the immediate or up-slope vicinity of the spring heads. In addition, the proposed rerouting and distributions of spring water discharge would be enabled by drains and ditches using naturally occurring local materials -- soils and gravels, which would not introduce foreign particulates nor alter the water chemistry. Increase or decreases from evapotranspiration would be minimal due to design features which maintain water movement through short distance subsurface drains or ditches. Downstream water resources would remain unaffected as there would be no alterations to downstream water routing or quantities. Lastly, no surface water within this spring system would be used for domestic drinking water.
Wetlands / Riparian Zones	PI	The Proposed Action may impact the riparian vegetation during such activities as vegetation removal or manipulation and modifications to the springbrook and dry ditch. These potential impacts will be discussed and analyzed in further detail in sections 3.4.4 and 4.2.4.
Wild Horses and Burros	NI	Based on a review of GIS the proposed project

Resource	Determination	Rationale for Determination
		area is within the Tassi-Gold Butte Herd Area for wild burros. The PARA 2008 GMP/RMP MA-TE-45: "Wild horses and burros will not be authorized on NPS and BLM-administered lands in the Monument. Burros on NPS-administered lands are managed to prescription set by the 1995 Lake Mead NRA Burro Management Plan. The herd management level for the Tassi-Gold Butte Herd Management Area will be set to zero on BLM-administered lands in the Monument. Burros will be removed rather than destroyed on site." Burros are known to visit the Tassi Ranch site but the Proposed Action is unlikely to impact burros. There may be increased visitation to the site to perform restoration or maintenance work but burros will likely avoid interactions with people. Burros will still have access to water outside of the project area. Wild burros are protected from harassment and harm under The Wild Free-Roaming Horses and Burros Act of 1971 (Public Law 92-195).
Wild and Scenic Rivers	NP	There are no river segments that are designated, eligible, or suitable as wild, scenic, or recreational under the Wild and Scenic Rivers Act in the PARA.
Wilderness	NP	Tassi Ranch is not in a Congressionally-designated wilderness area, based on a GIS review of the project area.
Wildlife (including BLM Sensitive Species, Species of Greatest Conservation Need, and Migratory Birds)	PI	The Proposed Action could affect aquatic species in the area, including sensitive species, by altering the location of the water course. Therefore, this will be analyzed in further detail.
Woodland/Forestry	NP	There are no woodlands or forests in or near the project area, based on a GIS review and agency knowledge of the project area.

3.4 Resources Brought Forward for Analysis

3.4.1 Cultural Resources

Little evidence exists for the earliest human use of the springs. Two discrete prehistoric lithic and ceramic loci have been documented within the boundaries of the Tassi Ranch site (Blalock et al 2004). The ceramic and lithic loci indicate use of the springs over a roughly 1,000 year span.

Any known later indigenous use of the spring is limited to the account of the spring deriving its' name from a Paiute woman that had lived in the area (Belshaw and Peplow 1980). Tassi was not identified in any of the more recent ethnographic studies (Deur et al 2014).

Euroamerican use of the spring began around 1876 with the establishment of Pearce Ferry and the wagon road though Tassi Wash. This early use of the springs, however, left no known visible mark at Tassi, and Euroamerican use decreased with the declining of the ferry.

The beginning of sustained use of the springs and development of the area began in 1912 when Sam Gentry began running a cattle operation out of the spring area. In 1913, Homer Englestead began wintering sheep at the spring. Sometime prior to 1917, Ed Thomas is believed to have constructed the first stone house at the site and the current spring box. This early house was constructed on the bench above the springs. Mature cottonwoods had already grown at the site by 1917, as the house and trees were mentioned by the General Land Office (GLO) survey crew. During Prohibition (1925-1929), Sid and Thyne Hecklethorne ran a herd of sheep at Tassi along with an impressive moonshine business (facilities to distill 500 gallon batches and store 1000 gallons). In 1929, Ed Yates acquired Tassi, and over the next twenty years, constructed most of the current landscape and structures. By 1936, the irrigation system was developed, and by 1941, the spring ditch and west holding pond had been constructed. The current ranch house was constructed in 1938, most likely with the stones used to build the earlier house. In 1973, Ed Yates sold Tassi to Jim and Dennis Whitmore. By 1979, the Whitmores had constructed the landing strip across Pigeon Wash from the ranch house, and had begun construction on a new holding pond.

The NPS asserted their claim to the property in 1998. Though the Whitmores had been evicted from living at the property in 1981, the facilities continued to be used as range improvements until the Whitmores failed to renew their grazing permit.

The first documentation of the site and stabilization work occurred the same year the NPS took possession. Additional documentation and stabilization work has continued at the site, albeit sporadically: in 1999, the ranch house was re-pointed and the first French drain installed; in 2003, a Cultural Landscape Inventory was conducted; in 2006, an Interim Treatment Plan was initiated by Pacific West Regional NPS staff; in 2007, the barn roof was repaired after a large branch fell on it and a section of the northern ranch perimeter fence was repaired; also in 2007, and again in 2010, re-pointing was conducted on the ranch house; in 2010 Historic American Landscape Survey (HALS) documentation was completed, and in 2013, the CLR was completed

by Pacific West Regional NPS staff. Additional work has focused on invasive weed removal, cutting of vegetation along active ditch berms, maintenance of appropriate habitats for relict leopard frog and Grand Wash springsnail, and fixing occasional breaches in the active ditch.

The Tassi Ranch complex was determined to be eligible to the National Register of Historic Places in 2004 under criteria A and C as part of the Cultural Landscape Inventory (Provencher 2003) evaluation. Identified Contributing Elements (CE) include the ranch house, barn, spring boxes, stock tank, lambing pen, fence/corral system, agricultural fields, irrigation ditches, holding ponds, ranch yard, and "cottonwood row" - a series of nine cottonwoods in the ranch yard.

3.4.2 Recreation

Tassi Ranch is located within the PARA Parashant Wildlands Recreation Management Zone (RMZ). The Parashant Wildlands RMZ encompasses 488,655 acres of BLM and NPS-managed lands. The RMZ includes the Tassi Ranch public use site within the NPS portion of PARA. The goals and objectives for the Parashant Wildlands RMZ is to provide recreation opportunities for extreme, world class, deep woodland exploration in remote and rugged Grand Canyon country through hiking, backpacking, hunting, canyoneering, and vehicle exploring (see Section 1.4 Conformance with Land Use Plans DFC-RR-15).

Visitors access Tassi Ranch via BLM Road 113 continuing onto NPS Road 1213. The road extends slightly beyond Tassi Ranch towards the Grand Wash Bay-managed by Lake Mead National Recreation Area. Tassi Ranch is a popular destination for motorized recreation visitors. Increased site visits are expected as motorized vehicle technology improves and motorized group Special Recreation Permits are issued.

Recreation use is typically higher during the fall, winter, and spring, when temperatures are lower. Recreation use lessens during the hotter summer months. Recreation is predominantly day use. Hiking is limited due to the lack of trails in the area and short walking distances from the parking area to the ranch house. Some camping occurs near the closed airstrip on the bluff overlooking the ranch house.

Recreation improvements and facilities currently include a parking area adjacent to the ranch house, a wayside exhibit detailing the history of Tassi Ranch, and a visitor register box. A decommissioned airstrip sits atop a nearby bluff.

3.4.3 Soils

The project area is mostly located over two soil types largely positioned along the existing topography, consisting of a 5-10 degree slope of one unit (Orrobo Series) which then merges with the second unit (Oxyaquic Torriorthents) at the base of the slope and into the adjacent dry wash. A third soil type (Meadview-Arizo complex) is present in the much smaller project area for the proposed vault toilet adjacent to the abandoned airstrip surface.

The multitude of these soil types stems from the intersection of active faults, aquifers, and ongoing seasonal flashfloods. The springs located in the project area stems from an exposed aquifer due to the vertical uplift of the Wheeler fault allowing the exposure of localized normal-faulted carbonate rock units (Kaibab Limestone). This uplifted portion forms the bulk of upper slope soil type (Orrobo Series). Towards the base of the slope and approaching the wash, multiple spring heads of varying flow rates occur over an approximate 130 foot linear area, corresponding with a riparian zone and a seasonal flash flood drainage contributing to the formation of the Oxyaquic Torriorthents with a mix of Typic Endoaquents. The third soil unit occurs on the other side if the Wheeler Fault and is composed of the more common Meadview-Arizo complex soil.

Soil Descriptions

The Orrobo Soil consists of very gravely loam with carbonate rock fragments of 35-75 percent with an overall average annual precipitation of 6-9 inches. Soil depths are typically very shallow to shallow, mostly formed over deposits of colluvium and fanglomerates, allowing the soil to be well drained.

Down the slope and along the spring heads and the wash, the dominate soil type is a 75% mix of Oxyaquic Torriorthents and 20% Typic Endoaquents. These are entisols that exhibit very little soil development other than a top layer soil horizon. This is corroborated by the appearance of Pigeon Wash below its confluence with Tassi Wash where low and moderate water flows are known to scour the top surface away. However, directly within the riparian zone of this soil unit, the soil character shifts to more organics with sandy loams with more mature horizons.

The Meadview-Arizo soil unit consists of much deeper and well drained soils, typically formed out of alluvium from Kaibab limestone and some remnant quartzite, schist, and granite from Virgin Mountain Alluvial fans. Overall the soil consists of very cobbly sandy loam (35-75 percent rock fragments) with well-defined soil horizons

3.4.4 Vegetation (including Wetland/Riparian Vegetation and Invasive Species)

The analysis area for vegetation is the 31 acre Tassi Ranch cultural landscape, plus an approximately 10 meter buffer around the cultural landscape as defined by the extant fencing, and approximately 0.3 acre on the overlooking bluff where two recreation/interpretation installations (vault toilet and signage) would be placed under Alternative A. Because the cultural landscape is inherently a modified landscape, the 10 meter buffer was included to capture information about the unaltered underlying vegetation.

According to a recent vegetation mapping project (Kearsley 2015), Tassi Ranch vegetation is composed of six vegetative alliances and a seventh designation of “Unvegetated Surfaces and Built Up Area” (See Map A-4). This seventh designation describes the parts of the agricultural fields, adjacent wash, road and disturbed area of the closed airstrip on the nearby bluff where

shrubs and trees are not present. Table 3.2 provides the acreages of the various vegetative designations within the project area.

Table 3.2. Current vegetation types and acreages currently at Tassi Ranch as of 2015.

Vegetation Alliance (Scientific Name)	**Vegetation Alliance (Common Name)**	**Acres (rounded)**
Acacia greggii shrubland	Catclaw acacia shrubland	9.5
Baccharis spp. – Salix exigua – Pluchea sericea shrubland	Baccharis-Narrowleaf Willow-Arrowweed shrubland	2.0
Larrea tridentata – Ambrosia spp. shrubland	Creosote-White Bursage shrubland	1.2
Larrea tridentata – Encelia spp. shrubland	Creosote-Brittlebush shrubland	9.3
Populus fremontii – Salix gooddingii woodland	Cottonwood-Goodding's Willow woodland	1.4
Prosopis glandulosa var. torreyana shrubland	Honey Mesquite shrubland	2.8
Unvegetated surfaces and Built Up Area	Same	6.1
Total		32.2

From a perspective based on soil types, the available provisional Ecological Site Descriptions (ESD) suggest the disturbed area near the proposed vault toilet and wayside could be a *Ambrosia dumosa - Larrea tridentata* rangeland (USDA 2018) if the disturbance of a road and airstrip had not occurred. This coincides well with the *Larrea tridentata-Encelia* spp. shrubland found at the periphery of the project area at this location. The other available ESD (USDA 2018), for the upland agricultural areas away from the wash and ranch house and ditch, suggests the rangeland shrubs should be composed primarily of *Hymenoclea salsola* and *Larrea tridentata*. Again, this coincides with the data collected during vegetation mapping. In both cases, a structurally similar bush to the expected species from the ESD pairs with the *Larrea*.

In general, the upland vegetation (the 2 *Larrea* shrubland alliances) and major vegetation alliances appear to be relatively stable after an initial explosion in growth following the cessation of grazing and fencing out of feral livestock in the 1990s. Areas within the agricultural fields are slowly converting to the native *Larrea*. Expansion of the *Prosopis glandulosa var. torreyana*, *Acacia greggii* and *Baccharis* spp. *– Salix exigua – Pluchea sericea* shrublands appear to be currently dominated by annual shifts in available surface water, and in areas in and adjacent to the wash, shifts in the substrate. This has led to a gradual increase in all three shrub types, with

occasional large scale declines due to flooding or drying. The *Populus fremontii – Salix gooddingii* woodland is not noticeably increasing in area, but in density. The *Salix*, in particular, has responded to the abundant water, fertile soil and release from grazing pressure by growing in increasingly dense clumps and is expanding into areas previously dominated by grasses.

Neither set of mapping captured the wetland and riparian vegetation well. Along the currently wet ditch or springbrook, wetland and riparian plant species include native *Carex* spp., *Typha* spp., *Anemopsis californica* and *Salix* spp. In addition, *Anemopsis* has been found near the ranch house and shed due to shifts in the water table and the malfunctioning French drain system that no longer keeps the ranch yard dry. On a roughly 1-3 year cycle, the wetland vegetation along the springbrook is cut back to provide good breeding habitat for the relict leopard frog and Grand Wash springsnail. This has had no apparent long term effects on the vegetation species or their relative abundances in the springbrook.

Invasive plants in the project area include *Schismus* spp. in the agricultural fields, and *Sisymbrium irio*, *Bromus* spp. and *Cynodon dactylon* in the ranch core area. Only one noxious weed has been identified within the project area, *Onopordum acanthium*. The only non-native wetland plant found to date is *Nasturtium officinale*. It has not been determined to be noxious in Arizona (USDA PLANTS 2018). Previous work in the Tassi Ranch area has reduced the number of species of invasive plants at Tassi Ranch as well as limited their populations. Species previously targeted include *Onopordum acanthium* and *Centaurea melitensis*. As of 2018, no *Centaurea melitensis* has been discovered at the site since 2012.

While the vegetation at the cultural landscape appears to be largely a mix of altered and native-encroachment, each vegetation alliance site coverage and location is currently only roughly in alignment with the percentage of the cultural landscape they would have covered during the defined period of significance. Ground level photographs from 1947, coinciding with the last year of the period of significance and the oldest photographs known from the site, show an open ranch yard with cottonwoods along what is currently the modern fence and a few large trees on the slope to the rear of the house. What can be seen of the sloping road and surrounding hillside to the agricultural fields and springbrook appear to have no woody vegetation on the slope between the level of the wash and house and the springbrook. The agricultural fields, assumed to be open during the period of significance due to the farming practices of the time and the need to continue maintenance of the fence that excluded livestock from the fields during portions of the year, have shown a slow conversion to *Larrea* and an expansion of mesquite and acacia as noted above and seen in aerial images first captured in 1992. The French drain, when initially installed, also created a steady water source for mesquite and acacia directly in front of the ranch yard, again indicated in historic images as an area devoid of large vegetation.

3.4.5 Visual Resources

The BLM has designated Visual Resource Management (VRM) classes in the PARA GMP/RMP to manage visual landscapes. The entire project area is within VRM Class I where the objective

is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change of the characteristic landscape should be very low and must not attract attention.

Tassi Springs is surrounded by a harsh desert landscape with converging canyons and washes. In contrast to the desert environments scarce vegetation, Tassi Springs is surrounded by a lush grass, brush, and trees. The bluff where the closed airstrip is located is scarcely vegetated with greater signs of motorized vehicle use. The ranch house and facilities associated with the site create a definite distinction in the densely vegetated wash.

Tassi Springs is a focal landscape with elements of the surrounding environment converging toward the wash and ranch site. The vegetation in the foreground is comprised of grass, brush, and trees, in a rugged wash bed. During the spring and summer, green hues surrounding Tassi Springs create a brilliant contrast to the converging sparsely vegetated hills. This is less vivid during the winter and fall when vegetation colors change to more dominant brown and yellow hues. Some patches of rocky barren soil create a distinction between the ground and vegetation in the wash. A historic field for farming to the west of the ranch house creates a break in the vegetation from the wash and hills.

The ranch house and recreation facilities, including a wayside exhibit, parking area, fences, and a closed airstrip create contrasts in the form lines and colors of the area. Fencing to delineate a parking area creates horizontal lines, while buildings create both vertical and horizontal lines in the vegetation. The colors of the buildings and fences are not a glaring change in color from a distance, but become more vivid closer to the facilities. See Appendix E for visual contrast rating worksheets and Appendix C for key observation point images.

3.4.6 Wildlife (including Migratory Birds and Sensitive Species)

Wildlife found in the project area is typical of the Mojave Desert, including a variety of small mammals, including desert cottontail rabbits, birds including raptors, and reptiles. Predators include coyotes, bobcats, and mountain lions.

3.4.6.1 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 (MOU) between the NPS and USFWS states that the NPS will

> Evaluate and document, as part of compliance with NEPA, the effects of the proposed action on migratory birds, focusing first on species of concern along with their priority habitats and key risk factors. Utilize the best available demographic, population, or habitat association data to assess impacts to species of concern. Also, identify where unintentional take that could reasonably be attributed to the action may have measurable negative effects on migratory bird populations. (NPS and USFWS 2010)

The USFWS is mandated to identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act. The USFWS *Birds of Conservation Concern 2008* (USFWS 2008) is the most recent effort to carry out this mandate. Bird species considered as Birds of Conservation Concern (BCC) include nongame birds, gamebirds without hunting seasons, subsistence-hunted nongame birds in Alaska, ESA candidate, proposed, and recently delisted species. Birds of Conservation Concern found on the Arizona Strip within the habitat type of the project area are summarized in Table 3.3 and details are provided in Section 3.4.6.2.

Table 3.3. USFWS Birds of Conservation Concern Found in the Project Area.

Species	Habitat Type in the Project Area
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*)
Burrowing Owl	Habitat includes open, well-drained grasslands, steppes, deserts, prairies, and agricultural lands, often associated with burrowing mammals. (*BLM Sensitive)*

3.4.6.2 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.

On PARA, the criteria are extended to include NPS-administered lands. All federally-designated candidate species, proposed species, and delisted species in the 5 years following delisting are included as BLM sensitive species (BLM 2017). Table 3.4 displays 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, based on occurrence records and monitoring data.

Table 3.4. Sensitive Species Associated with the Project Area

Common Name	Scientific Name	Potential for Occurrence
Peregrine falcon	*Falco peregrinus*	Potential
Golden eagle	*Aquila chrysaetos*	Potential
Western burrowing owl	*Athene cunicularia hypugea*	Potential
Greater western mastiff bat	*Eumops perotis californicus*	Potential
Spotted bat	*Euderma maculatum*	Potential
Allen's big-eared bat	*Idionycteris phyllotis*	Potential
Townsend's big-eared bat	*Corynorhinus townsendii*	Potential
Arizona myotis	*Myotis occultus*	Potential
California leaf-nosed bat	*Macrotus californicus*	Known
Arizona toad	*Anaxyrus microscaphus*	Potential
Relict leopard frog	*Lithobates onca*	Known
Grand Wash springsnail	*Pyrgulopsis bacchus*	Known

Peregrine falcon (*Falco peregrinus*)

Habitat and Range Requirements

Peregrine falcons utilize areas that range in elevation from 400 to 9,000 feet and breed wherever sufficient prey is available near cliffs. Preferred habitat for peregrine falcons consists of steep, sheer cliffs that overlook woodlands, riparian areas, and other habitats that support a high density of prey species. Nest sites are usually associated with water. In Arizona, peregrine falcons now occur in areas that had previously been considered marginal habitat, suggesting that populations in optimal habitats are approaching saturation (AGFD 2002a).

Nesting sites, also called eyries, usually consist of a shallow depression scraped into a ledge on the side of a cliff. Peregrine falcons are aerial predators that usually kill their prey in the air. Birds comprise the most common prey item, but bats are also taken (AGFD 2002a).

Project Area Evaluation

Potential nesting habitat is found along the steep cliff faces east of the project area along the Hurricane Cliffs. Peregrine falcons may also occur in the project area during foraging flights or to obtain water from the spring.

Golden eagle (*Aquila chrysaetos*)

Habitat and Range Requirements

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

Project Area Evaluation

Potential nesting habitat is found along the steep cliff faces east of the project area along the Hurricane Cliffs. Eagles likely utilize the project area for hunting and scavenging. The presence of the spring may attract small mammals, such as black-tailed jackrabbits, which are prey species for golden eagle.

Western burrowing owl (*Athene cunicularia hypugea*)

Habitat and Range Requirements

Habitat includes open, well-drained grasslands, steppes, deserts, prairies, and agricultural lands, often associated with burrowing mammals. Burrowing owls feed on a wide variety of prey, changing food habits as location and time of year determine availability. Large arthropods, mainly beetles and grasshoppers, form a large portion of their diet. Small mammals, especially mice, rats, gophers, and ground squirrels, are also important food items. Other prey animals include reptiles and amphibians, scorpions, young cottontail rabbits, bats, and birds, such as sparrows and horned larks (AGFD 2001a).

Project Area Evaluation

There is potential nesting habitat in the project area.

Greater western mastiff bat (*Eumops perotis californicus*)

Habitat and Range Requirements

In Arizona, where it is considered a year-round resident, the species been found in all Arizona counties except Yavapai, Navajo, Apache, and Santa Cruz. Habitat includes lower and upper Sonoran Desertscrub vegetation zones near cliffs, where it prefers rugged, rocky canyons with abundant crevices. Population trends are poorly known (AGFD 2002b).

Project Area Evaluation

Potential roost sites occur in the vicinity of the project area. This species may forage or obtain water in the project area.

Spotted bat (*Euderma maculatum*)

Habitat and Range Requirements

This insectivorous bat species is mostly collected in dry, rough desert scrub, with a few captured or heard in ponderosa pine forest. Population abundance and densities are very poorly known, but spotted bat is now known to occupy a wider total range and to be more common than initially thought (AGFD 2003a).

Project Area Evaluation

Potential roost sites occur in the vicinity of the project area. This species may forage or obtain water in the project area.

Allen's lappet-browed bat (*Idionycteris phyllotis*)

Habitat and Range Requirements

This insectivorous bat species has been taken most often in ponderosa pine, pinyon-juniper woodland, and riparian areas with sycamores, cottonwoods, and willows. Population trends are very poorly known (AGFD 2001c).

Project Area Evaluation

Potential roost sites occur in the vicinity of the project area. This species may forage or obtain water in the project area.

Pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*)

Habitat and Range Requirements

This insectivorous bat species is considered widespread with habitat in desert scrub, oak woodlands, pinyon-juniper, and conifer forest types throughout the state in summer (AGFD 2003b).

Project Area Evaluation

Potential roost sites occur in the vicinity of the project area. This species may forage or obtain water in the project area.

Arizona myotis (*Myotis occultus*)

Habitat and Range Requirements

This insectivorous bat species is known to occur in northern Arizona. The total range for this species includes southern California, Arizona, New Mexico, and Colorado, south to Mexico and possibly into west Texas (AGFD 2011). This species has been observed at higher elevations in Apache, Coconino, Cochise, Gila, Greenlee, Mohave, Navajo, and Yavapai Counties. Its elevation ranges from 3,200 to 8,620 feet; there are also records from much lower elevations between 150 and 1,000 feet along the Lower Colorado River (AGFD 2011). The AGFD suggests this species may use manmade structures for roosting, but based on radio tracking studies performed in northern Arizona, maternity colonies were frequently observed in large ponderosa

pine snags. It may use tree cavities, mines, or possibly caves for winter hibernation (AGFD 2011).

Project Area Evaluation

Potential roost sites occur in the vicinity of the project area. This species may forage or obtain water in the project area.

California leaf-nosed bat (*Macrotus californicus*)

Habitat and Range Requirements

This species is mostly found in desert scrub habitat. It primarily roosts in mines, caves, and rock shelters. Day roosts are in mines usually within about 80 feet of the entrance. They prefer roost sites with large areas of ceiling and flying space. In colder parts of their range, during winter, they are found in mines where temperatures are well above external ambient temperatures. During this time they are found in roosts with temperatures 80 °F and are usually found 100 feet or more back from the entrance. Nocturnal roosts are found in places that provide overhead protection and an adequate flight approach. Such places include a variety of manmade structures, rock shelters and mines (AGFD 2014).

Project Area Evaluation

Potential roost sites occur in the vicinity of the project area. This species may forage or obtain water in the project area. The historic structures within the project area could provide temporary roost sites.

Arizona toad (*Anaxyrus microscaphus*)

Habitat and Range Requirements

This species occurs in rocky streams and canyons from lower deserts up to the pine-oak belt. The elevation range is from near sea level to around 8,000 feet (AGFD 2013).

Project Area Evaluation

There is potential habitat for this species in the project area; however, amphibian surveys conducted at this site have not detected this species.

Relict leopard frog (*Lithobates onca*)

Habitat and Range Requirements

As habitat generalists, relict leopard frogs historically occupied a variety of habitats including springs, streams, and associated wetlands. Observations suggest that adults prefer relatively open shorelines where dense vegetation does not dominate (Bradford et al. 2005), and optimal habitat would seem to provide a balance among open water, open bank, and emergent vegetation. Such habitat features may require intermediate disturbance (e.g., flooding or grazing). Shallow water with emergent and perimeter vegetation provides cover, foraging, and basking habitat for both larvae (tadpoles) and metamorphosed frogs, whereas, deeper water, root masses, undercut banks,

and debris piles provide refuge from predators and potential overwintering sites (Jennings and Hayes 1994, Conservation Team 2005). Relict leopard frogs require some perennial water, particularly pools that persist long enough to allow tadpole development. Egg clusters are attached to stems of living or dead vegetation in shallow, low-velocity pools generally 5–7 cm deep. Pools with little to moderate cover seem to be preferred for oviposition (Conservation Team 2005), although, this may be influenced by differences in detection.

Project Area Evaluation

Tassi Springs is a translocation site for this species. Surveys in the spring of 2018 found 174 adult and juvenile frogs at this site (Jaeger and Rivera 2018).

Grand Wash springsnail (*Pyrgulopsis bacchus*)

Habitat and Range Requirements

This species occurs within the aquatic community associated with spring flows. Associated vegetation includes: cattails, sedges, cottonwood, willow, ash and mesquite. The elevation range for this species is 1,570 to 1,720 feet (AGFD 2001b).

Project Area Evaluation

This species is known to occur in the project area. According to a May 2004 survey, springsnails was found only in the upper 65 meters of the springbrook, with the highest density from 10 meters to 40 meters from the spring source. (Sada 2005). In 2012, springsnails were found up to 66 meters, in 2014 up to 60 meters, and in 2016 up to 70 meters during visual and subsequent benthic macroinvertebrate sampling (Bailard 2017).

Chapter 4

Environmental Consequences

4.1 Introduction

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

4.2 Direct and Indirect Impacts

4.2.1 Cultural Resources

4.2.1.1 Direct and Indirect Impacts of Alternative A – Proposed Action

Nearly every action proposed in Alternative A is derived directly from the recommended treatments of the HSR/CLR recently completed by NPS Pacific West Regional staff. The exceptions are the installation of the science monitoring station, monitoring wells, in-ditch weir, and vault toilet. Because the majority of the proposed actions represent current "best management practices" for historic preservation as applied to the specific Tassi features, the analysis of impacts will be kept to general activity types. For specific details on each element and treatment see Appendix B.

Prehistoric Artifact Scatters

Neither of the prehistoric artifact scatters would be impacted by the proposed activities, as all activity "footprints" lay outside the boundaries of the defined scatters, and the nature of the activities is such that no incidental damage is expected.

Structural Repair (Includes Buildings, Fences, Corrals, Spring Box):

All preservation work would follow the Secretary of the Interior's Standards for the Treatment of Historic Properties and recommendations in the CLR/HSR.

All proposed structural repairs (re-pointing, roof repairs, window/door repairs, etc.) would assess how much, if any, original material needs to be replaced. If replacement, in whole or in part, is

necessary, all replacements would be with in-kind materials. Additionally, any new materials or members added (bracing in shed and barn) would be in a method and style consistent with the rest of the structure or would be hidden or camouflaged. All re-pointing would use the mortar recipe developed from local materials by David Yubeta from Tumicacori National Historical Park.

The ranch yard fence is primarily of modern construction as an exclusion fence for feral cattle and burros. In the short-term, the fence would be repaired to continue its exclusion function, but would be replaced by a more historically-appropriate fence modeled on nearby existing fences and a 1947 image taken during the period of significance.

Vegetation Treatment

Most of the proposed vegetation treatments call for the removal of woody material in order to protect cultural features (irrigation ditches, chicken coop, and structural fire protection). The only proposed activity that would directly impact cultural features is the maintenance, and eventual removal and replacement, of the cottonwood trees. This impact, however, has been planned-for and mitigated by the propagation of cuttings from the existing cottonwoods and nurturing of suckers in order to replace the trees in-kind and in-place.

Water Control Features

Water is the greatest threat to the structures of Tassi Ranch. Maintaining the functioning irrigation ditch from the spring (springbrook), and the drainage system from spring box #1, is vital to the integrity of the Ranch Core. Most of this system, other than the French drain, is also historic.

The earthen irrigation ditches were created and maintained using a narrow-bucket backhoe to initially dig, and later dredge, the ditch, piling the spoil on the edges to create the berms. Proposed treatments include maintaining the functioning ditch in the same manner. Other activities proposed for the ditch include the installation of a weir and science monitoring station (discussed below), repair of the existing breach, and creation of a new breach. All of the proposed activities, other than the science station, would have a direct impact on the springbrook and part of the irrigation system. To mitigate these impacts, the course and character of the ditch would be maintained, fixing the current breach would be monitored by an archeologist, and the creation of the new breach would occur at a location and in a manner that would appear natural. The location of the new breach would be located to avoid impacting Locus 1 of the prehistoric component.

The French drain system was initially installed in 1999. In 2007, apparent failures in the system required exhumation of the system for repair, cleaning, and re-routing/extension of the outlet in Pigeon Wash. Proposed treatments include the cleaning and expansion of the French drain system and identification and repair of any future spring box issues. Recommended treatments from the CLR would include construction of an open-ditch on the hillside behind the structures

which may or may not occur depending on data from the proposed monitoring wells (discussed below). While the cleaning and repair of the existing French drain would have no direct impact on contributing elements, expansion of the system would have a direct impact on the ranch yard element and resolving the any future spring box issues may have a direct impact on that CE. All work involving the spring box and French drain systems would be overseen and monitored by an archeologist.

Modern Infrastructure

Various actions are proposed involving extant modern elements and introduction of new elements. The parking area and Pigeon Wash revetment and channel are regularly subjected to major flash-flood events. Due to this flooding, the existing visitor register box and wayside exhibit in the parking area have been partially buried. The proposed actions include returning the current level of the parking area to the pre-2014 flood level, hardening of the revetment, re-setting the register box and wayside, and re-contouring Pigeon Wash to redirect flood events. These actions would have no impact on the integrity of the site, landscape, or CE.

New elements proposed to be introduced include additional wayside exhibits and a vault toilet, spring monitoring wells, a concrete weir/flume, and a science monitoring station. The new exhibits and toilet would be installed south of Pigeon Wash and southwest of the ranch core and would have no impact on cultural resources.

The proposed spring monitoring wells would directly impact the ranch yard area in terms of encountering potential unknown buried resources and visual impact. To mitigate these impacts, an archeologist would monitor all drilling, all spoil dirt would be spread, and covering screens would be hidden.

The science monitoring station needs to be placed near the functioning irrigation ditch, but does not require ground disturbance. As such, its' only impact would be visual, which would be mitigated by hiding the equipment behind existing vegetation and painting the equipment and station in non-reflective, camouflage paint.

A concrete weir/flume is proposed to be installed either in-ditch or, preferably, at the new breach location. The weir would house a data-logger and be used by various agencies as a water-sampling location. Placement and construction of the weir would be overseen by an archeologist to ensure that no cultural resources are impacted directly or indirectly. The weir would be hidden or camouflaged to lessen any visual impact.

4.2.1.3 Direct and Indirect Impacts of Alternative B – No Action

With the No Action Alternative, the Tassi Ranch landscape would continue to be maintained in the haphazard, reactive way that it has been. The recommended treatments from the CLR would be implemented, but primarily in a "crisis mode," after the situation needing remedy has

worsened. The French drain system would continue to fail despite Band-Aid treatments because there would be no understanding of the subsurface spring movements.

4.2.2 Recreation

4.2.2.1 Direct and Indirect Impacts of Alternative A – Proposed Action

Under Alternative A, the Proposed Action proposes direct impacts to recreation through installations, repairs, replacement, and relocation of facilities used by visitors. Repairs and modifications to the ranch house or other buildings are not analyzed in this section. The Proposed Action describes improvements to the ranch house and buildings that could impact the historical setting and recreation experience. However, these actions would be mitigated to maintain the historic look and feel of Tassi Ranch (see the Cultural Resources section for more details). Recreation facilities including a vault toilet, wayside exhibit, parking lot, footbridges, trailhead register, and fencing will be analyzed in this section.

The existing parking area, wayside, and trailhead register were affected by a flood in 2014. The parking lot would be re-contoured and the wayside and trailhead register would be restored near the existing location. This would provide visitors with better parking that is ADA compliant and improve the trailhead register and wayside exhibits current condition. The existing wooden worm fence that was installed in 1998 would be updated to delineate the parking area and match the design of other constructed parking areas throughout the Monument. The fence design would fit the historic character of the site.

Water from various spring heads creates muddy areas that could deter some visitors from walking around the ranch site. Temporary footbridges may be placed to keep visitors from walking in the springbrook or other muddy areas. This could increase the length of stay for visitors by allowing them greater access to recreate and explore the area without increasing impacts to the springbrook.

A new vault toilet and wayside exhibit would be installed near the airstrip away from the historic ranch house. The airstrip is decommissioned; therefore the placement of the vault toilet near the airstrip would not impact recreational aviation. The wayside placement atop a bluff overlooking Tassi Ranch would give visitors the opportunity to see the greater layout of the historic landscape.

4.2.2.2 Direct and Indirect Impacts of Alternative B – No Action

The No Action Alternative would not allow for a variety of recreation facility improvements, including a new interpretive wayside exhibit, vault toilet, temporary footbridges, and an improved parking area. Additionally, the other improvements to the existing wayside and trailhead register would not take place. Improvements to the ranch house and other facilities would still occur, but maintained in a piecemeal fashion. This could result in the loss of recreation site visits and a degraded visitor experience.

4.2.3 Soils

4.2.3.1 Direct and Indirect Impacts of Alternative A – Proposed Action

The Proposed Action seeks to modify the soil in three meaningful ways. First is the development of ditches near the vicinity of the historical structures to enhance draining of the nearby spring water. Second is the proposed re-contouring of the adjacent areas near the historical structures to include vegetative debris, grasses, and the upper most horizon layers of the entisol soils. This re-contouring would resurface the current parking lot and terminate at the current intersection of the dry wash and parking area. Lastly the soil would be modified with the installation of a vault toilet on the Meadview-Arizo soil unit, in an area already disturbed by use of an abandoned airstrip.

Ranch Yard Surface Ditches

Direct soil impacts that would occur with installation of 266 feet of water draining ditches near the historical structures would have short term issues such as soil compaction from heavy machinery treads and tires, temporary placement of building materials. These soils are also the most meaningful soils in the project area as they are within the riparian zone, supporting vegetation. Erosion impacts would be negated by the design features of the French drain keeping sediment transport and surface runoff minimized. Overall impacts would be minimal given the rapid regrowth rate of the overlying riparian habitat. Indirect impacts would include some collateral soil loss as these ditches are created with excess soil piles being discarded or used to berm up other nearby ditch ways. There would also be some short term indirect gullies and sheet erosion on and near these ditch surfaces as the denuded soil surfaces would be susceptible to surface runoff from intense thunderstorm activity.

Re-Contouring Surfaces

The most notable modification to the project area from a passerby would be the re-contouring of the immediate vicinity of the historical structures and the parking lot. Half of the re-contouring would take place on the mature organic soils which currently support salt grass and cottonwood trees, while the other portion would be within lesser developed entisol soil stemming from the dry wash. Direct impacts to soil within this riparian zone would be mostly short term effects of denuded vegetation and one time compaction from heavy machinery. Design features would utilize shallow scraping and same-soil fill placement. The parking lot surface would be re-contoured to a match the existing natural slope line which would facilitate surface runoff drainage. Short term erosion would present the most impact from surface runoff from precipitation events as the 1-10% slope of denuded soil surface would be prone to ruts, gullies, and sheet erosion. Some short term wind driven erosion could be possible but minimized by the surround topography. Indirect impacts of re-contouring would be some soil loss due to erosion processes with some deposition occurring downstream the dry wash. These displaced soils would be very diffuse in the dry wash and unlikely to interact meaningfully with any downstream soil units, nor alter ecological habitats or wildlife usage.

Installation of Vault Toilet

This portion of Proposed Action has the smallest impacted area and is located a short distance away from the main project area on the Meadview-Arizo soil unit. The proposed site for the installation of a standard vault toilet structure is a disturbed surface from an airstrip, now non-operational and closed to future use. Direct impacts would be short term as design features direct the resulting 1 cubic yard of soil pilings from the construction of the septic vault to be diffused into the immediate area. Impacts from soil compaction would be negated by the prior compaction of the air strip usage. Erosion impacts would be minimal as the proposed site is not on a slope or near any significant drainage. Indirect impacts would be minimal as roadside service to the vault toilet would take place on an existing road surface and would not contribute to further soil compaction.

4.2.3.2 Direct and Indirect Impacts of Alternative B – No Action

The No Action Alternative would manage and maintain the project area in its current state with low performing drains, no re-contouring near the historical structures nor parking lot area, and no installation of vault toilet. Direct impacts would remain minimal with no soil loss in the riparian zone or compaction. However the soils nearest the spring heads would remain in a saturated state overlain with enhanced vegetative growth, which modify the soil chemistry and characteristics. Indirect impacts would include increased chance of fluvial erosion along the banks of the dry wash and into the parking lot, absent the re-contouring. These eroded soils would then be present downstream in sizeable quantities.

4.2.4 Vegetation (including Wetland/Riparian Vegetation and Invasive Species)

4.2.4.1 Direct and Indirect Impacts of Alternative A – Proposed Action

Under Alternative A, the Proposed Action, direct impacts to vegetation would occur. In general, some plant species would be removed from several areas and the same or other plant species would be encouraged to grow in areas where it was found during the period of significance or to help stabilize fragile habitat areas for special status animal species. Vegetation would be managed according to an overarching plan with major vegetation manipulation determined by the management goals of the CLR, namely to bring the vegetation, where damage to special status species would not occur, back into alignment with the known characteristics of Tassi Ranch circa 1936 to 1947. Some vegetation manipulation would be dictated specifically for special status species benefit, this too would be planned into the larger maintenance of the site. Ad hoc vegetation manipulation would be restricted to responding to unforeseen events that caused resource injury such as flooding, windstorms or undetected die-off of vegetation.

More specifically, non-riparian areas of the ranch yard, road, parking area and agricultural fields would be maintained to minimize shrubs and non-LE trees. For the first three areas (see Map A-4), cumulatively about 1.5 acres, this would primarily decrease the density and percent cover of *Prosopis glandulosa var. torreyana, Acacia greggii* and assorted small shrubs. Within the ranch

yard, post-contouring, grasses are expected to rapidly recolonize the bare soil. In the agricultural fields, the mixed *Prosopis* spp. and *A. greggii* would slightly decrease in percent overstory cover due to trimming necessary to find and maintain the historic fences and maintaining the field perimeters. The main change in the approximately 4 acres of agricultural fields would be a decrease in *Larrea* (See Map A-3. The dots visible on the aerial imagery are individual shrubs). *Larrea* has spread throughout the dormant fields in densities exceeding 70 per acre. This is not evident in the vegetation mapping results due to the characterization of the fields as "Unvegetated surfaces and Built Up Area". The *Larrea* would be actively removed using physical removal of the above ground vegetation and likely the application of an herbicide to the cut stump.

Wetland species composition would not change, however wetland species in the ranch yard may decrease as the area is dried out to preserve the historic structures. In the wash, realigning the springbrook to a more downstream breach point should not decrease the facultatively wetland species such as *Prosopis* and *Acacia*, instead the wetted area would most likely shift down the wash approximately the same amount as the distance to the new breach, approximately 260 feet. In the springbrook itself, the wetland species would continue to be cut back or removed by no more than 1/3 of the springbrook in accordance with the needs of relict leopard frog and Grand Wash springsnail as laid out in the Interim Treatment Plan and recommendations by Dr. Don Sada (2007).

Treatment of invasive plant species would also have a direct impact. These species would decline in population size and may be eradicated from the site. This would indirectly open up habitat for native plant species adapted to the spring systems of this part of the Mojave Desert.

4.2.4.2 Direct and Indirect Impacts of Alternative B – No Action

Under this alternative vegetation would be managed according to the 2007 Interim Treatment Plan. Vegetation would be periodically removed or cut back to allow access to the site for monitoring of special status animal species and to provide a path for visitors to the main ranch yard and potentially to the springbrook and agricultural fields. Damaged and dying large vegetation would be cut back as needed on an as needed basis and no plans for regeneration/replacement of contributing elements such as the cottonwood row would be made. This would result in the site moving further from the historic landscape and potentially leading to the loss of contributing elements to the cultural landscape as well as an expansion of invasive plants, since the invasives at the site would not be managed holistically.

4.2.5 Visual Resources

4.2.5.1 Direct and Indirect Impacts of Alternative A – Proposed Action

The Proposed Action would create minor changes to the facilities near the ranch house, temporary changes to the vegetation, and very low permanent contrasts from the vault toilet and

wayside exhibit installations near the airstrip. These changes would be mitigated through design features and placement of new facilities. These will be discussed in further detail below.

The Proposed Action would re-contour the existing parking area. This would not create any change to the visual impacts due to reusing onsite materials. New fencing delineating the parking area would create a temporary change to the visual contrasts of the area. Fencing materials would be selected to blend with the landscape through natural weathering. The change in color from new fence posts would be a short time frame of 1-3 years. The current locations of the wayside exhibit and trailhead register are non-obtrusive to visual resources. They are low-lying and placed so as to not distract from the regular forms, lines, and colors associated with the landscape and buildings. Following reconstruction of the parking area, the wayside and register would be placed in a similar location so as not to degrade visual resources. All materials used to improve and stabilize the ranch house would be in kind, thus maintaining the current colors and textures.

Vegetation treatments and removal of hazardous dying cottonwoods would create temporary changes to the form, lines, and colors to the site. Removing vegetation would expose more of the ranch house from key observation points, thus making the ranch house more vivid and strengthening the lines from the building structure. New trees would be planted where old ones were removed to restore the original landscape over time.

Installation of a new vault toilet and wayside exhibit would create changes to the visual landscape; however this would be mitigated through placement of these facilities. The location of the vault toilet was selected so as to not distract the views the around the ranch house and surrounding area. The top of the bluff where the decommissioned airstrip is located is largely blocked due to vegetation and cliffs from the ranch parking area. The vault toilet would not be seen from the ranch house. It could be seen as visitors continue on NPS Road 1213 toward Grand Wash Bay, however design elements using standard environmental colors would help blend the vault toilet with the surrounding landscape. The new wayside exhibit would be constructed using base materials that would weather over time to blend with the natural landscape. The information panel would be placed to reduce glare or any significant changes to the color of the landscape.

The project is not expected to create any visual change to the landscape that would not meet VRM Class I standards and would continue to be managed to meet the objectives of VRM Class I.

4.2.5.2 Direct and Indirect Impacts of Alternative B – No Action

Under the No Action Alternative routine maintenance to remove hazardous trees, repair fencing, and the historic ranch structures would continue. Maintenance actions would impact visual resources. However, all maintenance projects would be mitigated to meet the directions of VRM Class I management. In this alternative, the vault toilet and new wayside exhibit would not be installed. This would reduce any new additional visual impacts near the airstrip.

4.2.6 Wildlife (including Migratory Birds and Sensitive Species)

4.2.6.1 Direct and Indirect Impacts of Alternative A – Proposed Action

The Proposed Action may have impacts on wildlife, including sensitive species, migratory birds, small mammals, raptors, reptiles, and predators. Wildlife may be temporarily displaced by proposed activities due to noise and human presence. These animals would be expected to return after activities cease. A small amount of habitat would be disturbed temporarily during maintenance activities. However, this habitat would eventually become suitable after natural rehabilitation and there would be no net loss of habitat.

4.2.6.1.1 Migratory Birds

Migratory birds may be temporarily displaced by proposed activities due to noise and human presence. They would be expected to return after activities cease. No take of any migratory bird species is anticipated.

4.2.6.1.2 Sensitive Species

Peregrine Falcon and Golden Eagle

Peregrine falcons or golden eagles foraging or watering in the project area may be temporarily displaced by proposed activities due to noise and human presence. Habitat for golden eagle prey species, such as black-tailed jackrabbits, could be temporarily impacted by vegetation maintenance. Disturbance to nest sites from the Proposed Action is unlikely given the remote and inaccessible locations these species choose for nesting. Implementation of the Proposed Action is not likely to impact peregrine falcon or golden eagle nesting success.

Bats

Bat species foraging or watering in the project area are not likely to be displaced by proposed activities since bats are active at night and project activities would occur during the day. Habitat for bat prey species (insects), could be temporarily impacted by vegetation maintenance and changes to the ditch. These disturbances to habitat would be temporary. Disturbance to roost sites from the Proposed Action is unlikely given most roosts are well away from the project area.

Arizona Toad and Relict Leopard Frog

Amphibians in the project area would be disturbed by the Proposed Action in or close to water due to noise and human presence. This disturbance would occur repeatedly since they are unable to escape due to the need to stay close to water. The disturbance would, however, be short in duration and infrequent. Frog and toad habitat would be temporarily altered by the Proposed Action. Changes to the ditch would cause a drying of habitat in some areas and the creation of new habitat in other areas. These animals should be able to move in response to these changes and not be greatly affected.

Grand Wash Springsnail

Individual springsnails, being far less mobile than other animals, may be killed during activities affecting the water and vegetation near the water. However, the loss of some individuals should only temporarily affect the population at this site and springsnail numbers would be expected to recover. Changes to the ditch would cause a drying of habitat in some areas and the creation of new habitat in other areas. Again, because spring snails are less mobile some snails may be killed as habitats dry. Eventually, the new habitats would become occupied by springsnails.

4.2.5.2 Direct and Indirect Impacts of Alternative B – No Action

Alternative B would have fewer direct and indirect impacts on wildlife, including sensitive species, migratory birds, small mammals, raptors, reptiles, and predators. Some maintenance activities would continue to occur causing temporary disturbance due to human activity and temporary modification of habitat.

4.2.5.2.1 Migratory Birds

Some maintenance activities would continue to occur causing temporary disturbance due to human activity and temporary modification of habitat. These disturbances would likely be less frequent under this alternative. No take of any migratory bird species is anticipated.

4.2.5.2.2 Sensitive Species

Peregrine Falcon and Golden Eagle

Some maintenance activities would continue to occur causing temporary disturbance of foraging and watering due to human activity and temporary modification of habitat. These disturbances would likely be less frequent under this alternative.

Bats

Some temporary disturbance to prey species may still occur under this alternative due to maintenance activities. These disturbances would likely be less frequent under this alternative.

Amphibians

Maintenance of the ditch and vegetation around the ditch and springs may cause temporary disturbance to frogs and toads due to human activity. Drying and creation of habitat would not occur under this alternative.

Grand Wash Springsnail

Fewer springsnails would be killed under this alternative because there would be no changes to the location of ditch spillage. Some springsnails would still likely be killed during maintenance of the ditch and vegetation around the ditch and springs.

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.

4.3.1 Cultural Resources

The cumulative impact area of analysis is the 31 acre cultural landscape.

Past and Present Actions

Until 1998, Tassi Ranch was a functioning cattle ranch. This means that the fences, corrals, stock tank, irrigation ditches, and agricultural fields were being regularly maintained, repaired, and elements replaced. The structures would also have undergone sporadic maintenance and repair as issues arose.

Following NPS acquisition, abandoned modern ranching materials and debris were removed from the property, and sporadic vegetation and structural maintenance and repair began as a long-term treatment plan was developed. Specific treatments include: re-pointing of the ranch house (1999, 2007, 2010); repair of the northern perimeter fence (2007); repair of the barn roof (2007); installation and maintenance of the French drain (1999, 2007); and sporadic vegetation removal along the spring brook berms, removal of invasive species, and redirecting the French drain outlet to stop the expansion of mesquite into the historic views.

The current proposed actions include all of these previous activities in addition to maintenance of the irrigation ditches (working and abandoned), holding ponds, and vegetation.

Future and Foreseeable Actions

While a few of the actions proposed would conceivably only occur once (weir, waysides, toilet), most of the proposed actions are maintenance activities that would occur regularly, whether on a set schedule or as conditions require. Water systems and vegetation would always require regular maintenance to continue functioning properly (ex. French drain) and to maintain historically accurate vegetation types, locations, and densities. Historic structures would also always require maintenance and repairs, though on an "as-needed" basis as wind, rain, and gravity continue to erode and remove original fabric (pointing, wood, exposed metal, etc.).

Considerations of Incremental Contributions of Proposed Action

The "in-perpetuity" maintenance of these types of historic and masonry structures is, ultimately, a losing battle. There could, conceivably, come a day when there is very little to no original

historic fabric left to these structures. Rigorous detailed documentation of every treatment, and collecting samples of all original materials, is the best that can be done to “save” these structures.

As long as all of the currently proposed treatments and additions are conducted with the recommended “best practices” detailed in the Secretary of the Interior's Standards for the Treatment of Historic Properties and the CLR, we can forestall the day when the appearance and location of the Tassi Ranch Landscape and its Contributing Elements are all that remains of its historic nature.

4.3.2 Recreation

The cumulative impact area of analysis for recreation resources issues consists of the project area, defined in Section 2.2.1 Alternative A. The temporal scope of analysis extends for a 20 year timeframe. This is a reasonable time frame when considering foreseeable actions as recreation resources receive continued monitoring and maintenance to ensure the resources remain in operating condition.

Past and Present Actions

Past and present actions include the shifting operational and management history of the area and recreation facility projects. From the early 1900s to 1947, Tassi Springs was used primarily for sheep and cattle operations. In the 1980s, the NPS took over ownership and maintenance of the site. In 2000, the NPS and BLM began managing the site and doing facility repairs and stabilization. Past recreation projects have included fence repair and structure stabilization. The management of Tassi Springs was also identified as a Public Use Site in the 2008 PARA GMP/RMP.

Present actions have focused on maintaining recreation resources for visitors to the ranch site. This includes permitting motorized tour groups to visit the site and improvements to wayside exhibits, trailhead registers, and information about the history of Tassi Springs through digital and printed media outlets.

Future and Foreseeable Actions

Recreation interests in cultural sightseeing is likely to increase as Off Highway Vehicle (OHV) technology improves and Special Recreation Permits are obtained to provide motorized vehicle tours. New facilities and improvements under the Proposed Action would likely increase visitation to the site and could increase the amount of time visitors spend at the site.

Consideration of Incremental Contributions of Proposed Action

The Proposed Action would improve the conditions of existing recreation facilities while adding a new wayside exhibit and vault toilet. Cumulatively, this would include new installations and construction to improve the visitor experience over the life of the project. The No Action Alternative would not improve the parking area or include the installation of a kiosk or wayside

exhibit. Cumulatively, this would result in less facilities and a degraded parking area and wayside. Overall degradation to the recreation experience is expected to be minimal under both alternatives as projects to maintain the integrity of the Tassi Spring Ranch would likely continue.

4.3.3 Soils

The cumulative impact area of analysis for soil resources issues consists of the general project area to include the separate smaller off site area for the proposed vault toilet. The temporal scope of analysis extends 20 years into the future. This temporal scope was chosen because 20 years is a reasonable time frame when considering foreseeable actions as soil resources in the project area would succumb to natural erosion, seismic events, visitation usage, fluctuations in aquifer levels, and flash flood events.

Past and Present Actions

Past and present actions include the installation of an artificial ditch and canal drainage network which directed spring discharge water towards previously used agricultural fields. Sedimentation of these canals and ditches would accrue over time and would require annual maintenance to maintain this artificial water flow. Currently most of these ditches and canals have been abandoned with most of the spring water being diverted into the remaining waterway, terminating at the adjacent dry wash. This has contributed to additional silt beds being deposited on unused canal ways as well as removal of top soils due to new stream bed processes as the spring discharge shifted over the years. The current waterway has created saturated soils immediately adjacent to the historical structures.

Future and Foreseeable Actions

As stated, the Proposed Action seeks to supplement this current configuration of spring water drainage, along with resurfacing the area around the historical structures, with an installation of an offsite vault toilet. This new proposed drainage configuration would reduce soil moisture levels in the vicinity of the historical structures; however, the drainage would saturate other down slope areas of soil where the drains terminate. This would be quickly followed by surges of riparian vegetative growth on the newly saturated soils altering the organic components of their characteristics.

Ongoing processes such as seismic events and anthropogenic climatic changes, altering the spring discharge levels due to aquifer permeability or lower precipitation recharge, are a future possibility. Neither alternative would have any significant effect on altering the potential changes to the spring discharge levels from these two large scale processes.

The proposed resurfacing of the adjacent upper soils in Alternative A around the historical structures in 20 years would become naturally contoured over time and difficult to discern. The gradation of the slope into the adjacent dry wash would allow normal flood events to evenly leave sediment deposits. Intense 100 year episodic flood events would be allowed to fan out naturally past the project area, eroding out some dry wash entisol soils but reducing the overall

sediment transportation. Conversely, in the No Action Alterative, 100 year episodic flood events would have greater ease to scour out the existing berm of the current parking lot surface, removing sizeable amounts of entisol soils and creating an unguarded approach for flood waters towards the historical structures.

Considering the vault toilet feature in Alternative A, over the course of twenty years, recreation interests at this proposed project area is likely to increase as OHV use, enhanced aerial imagery, and social media trends increase awareness and ease of access to the site, which would lead to further compaction on already disturbed soils of the parking lot due to vehicle usage and foot wear on trails. In addition, installation of a vault toilet would increase compaction in the immediate vicinity of the egress of the toilets. However it would overall reduce disturbances to topsoil by containing the human waste associated with more frequent visitation.

Consideration of Incremental Contributions of Proposed Action

When considering each of the components of Alternative A as contributing factors in terms of soil resources, no unwanted cumulative effect has been found. The proposed actions of modifying spring water drainage and top soil resurfacing, along with the design features, would leave already slightly disturbed soils mostly in place. In addition, other than the resurfacing of the soils around the historical structures and the parking lot, which would allow for increased soil retention during flood events, the cumulative effects for Alternative A would be similar to Alternative B (No Action).

4.3.4 Vegetation Including Wetland/Riparian Vegetation and Invasive Species

The cumulative impact area of analysis is the 31 acre cultural landscape and the approximately 250 acres surrounding the ranch, bounded by the narrowing of Pigeon Wash to the east and west and the northern and southern ridgelines of the wash.

Past and Present Actions

Until the late 1990s, Tassi Ranch was managed as a functioning cattle ranch. The vegetation was grazed on the ranch in the agricultural fields during various times of year as well as harvested against times of year where forage for cattle was not readily available. The fields were irrigated to maintain the forage while the area around the ranch buildings was drained to keep the buildings dry. Outside the fenced 31 acres cattle grazed freely in the hills and washes. After 1996, the area was maintained as a visitor site. The area was closed to grazing after the implementation of the 2001 Mojave Desert Tortoise Plan. Maintenance of the ranch site since then has included periodic cutting back of vegetation, removal of dead vegetation, herbicide treatments of invasive and native encroaching vegetation. Modifications to the existing irrigation system have occurred to preserve the ranch buildings and to limit the accumulation of vegetation in non-historically accurate locations. Vegetation has also been removed to allow for the continued use of the established roads, including NPS 1213 (old Pearce Ferry Road), and was removed illegally during the creation of the airstrip.

Future and Foreseeable Actions

To maintain visitor access to the site and the appropriate level of vegetation as defined by the period of significance, vegetation within the cultural landscape would need to continue to be manipulated in a variety of ways. In the area surrounding the cultural landscape, no other vegetation manipulation is envisioned other than providing continued passable roads.

Considerations of Incremental Contributions of Proposed Action

The Proposed Action would systematize the current somewhat haphazard approach to vegetation management at the site. In the context of the larger landscape, vegetation density or type is not expected to appreciably decrease. Within the site, trees and large shrubs would be managed to provide multi-age class stands as opposed to the near single age stands that grew after the ranch was no longer grazed. This would increase the resiliency of the native landscape against invasives and any climatic shifts. Under the No Action Alternative, the ranch vegetation would continue to be treated as needed. As has been seen over the last several years, the result of such action is a need to treat and retreat some areas while other areas of vegetation are largely ignored due to a crisis management approach instead of an overarching plan. The vegetation types and locations have steadily moved away from the desired look of the period of significance.

4.3.5 Visual Resources

The cumulative impact area of analysis for visual resource management issues consists of the 31 acre project area. The temporal scope of analysis extends for a 20 year time frame. This is a reasonable time frame when considering foreseeable actions related to VRM as the GMP/RMP directs management of the area over that time.

Past and Present Actions

Since the early 1900s many human actions have affected the visual resources around Tassi Springs. While the landscape characteristics have primarily remained unchanged, vegetation and structural changes to the cultural landscape have occurred. Past actions focused on ranching operations, present actions have centered on preserving the historic structures and visitor use management. Past actions, including the construction of the ranch house and other facilities related to the cattle operations and farming led to changes in the form, lines, colors, and textures of the area. An airstrip was also constructed in the past, creating a linear feature atop a nearby bluff. Present actions related to visitor use have resulted in the construction of a parking area, wayside exhibit, trailhead register, and constructing fences. The past and present structures have been managed to maintain the historic look and feel of the area.

Future and Foreseeable Actions

Future and foreseeable actions include stabilizing historic structures, improving the parking area, moving the wayside and trailhead register, installing a new fence, wayside, and vault toilet and removing hazardous trees. All future and foreseeable actions would be designed to meet visual resource management objectives. This would include using visual contrast rating forms to

determine the characteristics of the landscape and mitigating any changes to land, vegetation, and structural features.

Consideration of Incremental Contributions of Proposed Action

The Proposed Action would improve the conditions of existing recreation facilities and create new features, including a new wayside and vault toilet. The maintenance and construction of these facilities would incorporate VRM practices over the life of the project.

The No Action Alternative would leave the resources in the same current condition with minor maintenance occurring. This would leave the resources with the same visual resource characteristics as they are now. Overall, degradation to VRM under both alternatives is expected to be minimal. By mitigating impacts to VRM that would occur under the Proposed Action, it is likely any changes to VRM would be minimal.

4.3.6 Wildlife (including Migratory Birds and Sensitive Species)

The cumulative impact analysis area for wildlife is the project area and adjacent lands within 3 miles. The impacts of the Proposed Action would be confined to a small area; however, wildlife territories that may be impacted would be slightly larger.

Past and Present Actions

In the past, the project area was heavily impacted by human activities including human residence, diversion of the springs, and agricultural practices. These activities could have caused disturbance to wildlife and destruction of wildlife habitat. Past maintenance and restoration projects have had similar impacts on wildlife and wildlife habitat as those described as direct/indirect effects from the Proposed Action. Past livestock grazing and operations caused disturbance to wildlife and their habitat. Recreational pursuits, particularly OHV use, have caused disturbance to most all species and their habitats. With the increase of local populations in the region, a dramatic increase in the level of OHV use has been realized, resulting in increased disturbance, injury, and mortality to wildlife, particularly ground dwelling species with low mobility. Tassi Ranch functions as a destination attracting such activities to the analysis area. Wild burros have in the past and are continuing to adversely impact wildlife habitat including damage to riparian and upland vegetation.

Future and Foreseeable Actions

Recreational use of the area is anticipated to increase and the resulting impacts described above are likely to increase. Tassi Ranch functions as a destination attracting such activities to the analysis area. Wild burros have proven to be difficult to keep out of the project area (in spite of fencing) and are likely to continue, occasionally, to adversely impact the area and specifically at the springs when they are able to breach the fence.

Consideration of Incremental Contributions of Proposed Action

It is anticipated that the Proposed Action would have incremental cumulative impacts to wildlife, particularly when added to other past, present, and reasonably foreseeable activities in the area. Although these impacts are additive, they would be minimal as described in the direct and indirect impacts section.

Chapter 5

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

Public scoping was formally initiated by PARA on April 10, 2018, with the mailing and emailing of a scoping letter to the public, Tribes, and various agencies, and posting the same information to the NPS' PEPC and BLM's ePlanning websites. Scoping occurred for 30 days, ending on May 9, 2018. A total of 5 entities or persons provided comments.

A recurring theme in the public scoping comments was a request to prioritize natural restoration of Tassi Springs over maintaining historic structures; an additional alternative was added in Section 2.3.3 to address this issue. Additional comments were made by most parties regarding monitoring of relict leopard frog and Grand Wash springsnail, fence construction and layout and signage; modifications to the Proposed Action were made to address these comments. One comment, regarding remote cameras and rapid response monitoring, currently exceeds our abilities to reach satellites from the low elevation and within-canyon Tassi Ranch without adding extensive infrastructure. Another comment, regarding a new parking area and toilet led to the inclusion of a vault toilet (See Visitor Infrastructure subsection of 2.2.1) in the Proposed Action but not a different parking area. Given the topography of the site, including the extreme seasonal variability of Pigeon Wash, neither the toilet nor the parking area could be placed in the wash. The stable location for the vault toilet, up a road past Tassi Ranch, while accessible by vehicle, would require pedestrians to walk up and down slopes exceeding 25% on a single wide road with no shoulder to avoid any oncoming traffic, a safety hazard. At this time, anecdotal evidence also indicates the majority of those who choose to camp at Tassi Ranch are actually camping on the closed airstrip to avoid riparian-associated gnats.

5.3 Tribal Consultation

Tribal consultation began with consultation with the BLM Arizona Strip District Tribal Liaison Officer (TLO), whose duties include the NPS portions of Grand Canyon-Parashant National Monument, in March 2018. The TLO felt at that time that this project would not "limit access to any ceremonial use or to any Indian sacred sites on federal lands by American Indian tribes who have interest on the AZ strip". Formal tribal consultation was initiated in November 2018 to specifically address the question of presence of historic properties with religious or other cultural significance under 36 CFR Part 800.4(c)(2). No comments from tribes have been received to date. Tribal entities consulted are:

- Bodaway/Gap Chapter Coordinator
- Cameron Chapter Coordinator
- Cedar Band of Paiutes
- Coalmine Canyon Chapter Coordinator
- Colorado River Indian Tribe
- Coppermine Chapter Coordinator
- Havasupai Indian Tribe
- Hualapai Cultural Resources
- Hualapai Indian Tribe
- Indian Peak Band of Paiutes
- Kaibab Band of Paiute Indians
- Kanosh Band of Paiutes
- Koosharem Band of Paiutes
- LeChee Chapter Coordinator
- Moapa Band of Paiute Indians
- Navajo Nation Heritage & Historic Preservation
- Pahrump Band of Paiutes
- Paiute Indian Tribe of Utah
- Pueblo of Zuni
- San Juan Southern Paiute Tribe
- Shivwits Band of Paiutes
- The Hopi Tribe
- To'Nanees'Dizi Chapter Coordinator

5.4 Section 106 Consultation

Informal discussions with the Arizona State Historic Preservation Office (SHPO) about the undertaking were initiated in early 2018. Formal Section 106 consultation is anticipated shortly.

5.5 List of Preparers and Reviewers

Tables 5.1 and 5.2 list specialist and reviewers who contributed to preparation of this EA.

Table 5.1 List of federal preparers/reviewers

Name	Title	Resource Area(s) of Specialty
Jennifer Fox	Ecologist	Project Lead/Vegetation
Gloria Benson	Tribal Liaison	Tribal Liaison
Sueann Brown	Historical Architect, NPS Pacific West Region	Cultural Resources

Jannice Cutler	Rangeland Conservation Specialist	Rangeland, Wild Horse and Burro
Susan Dolan	WASO Program Manager Park Cultural Landscapes Program	Cultural Resources
Vida Germano	Cultural Landscapes Program Manager, NPS Pacific West Region	Cultural Resources
Elizabeth Gordon	Regional Section 106 Coordinator, NPS Pacific West Region	Cultural Resources
Amber Hughes	Planning and Environmental Coordinator	NEPA Compliance
Eathan McIntyre	Physical Scientist	Soils, Water Quality
Alan Schmierer	Regional Environmental Coordinator, NPS Pacific West Region	NEPA Compliance
Eirik Thorsgard	Regional Cultural Anthropologist/American Indian Liaison, NPS Pacific West Region	Cultural Resources
David van Alfen	Archeologist	Cultural Resources
Mark Wimmer	Monument Manager	Project Oversight
Braden Yardley	Outdoor Recreation Planner	Recreation, Visual Resources
Jeff Young	Wildlife Biologist	Wildlife, Threatened and Endangered Animal Species

Table 5.2 List of non-federal reviewers

Name	**Title**	**Agency/Organization**
Rob Nelson	Habitat Evaluation and Lands Program Manager	Arizona Game & Fish Department
Luke Thompson	Field Supervisor	Arizona Game & Fish Department

References

Arizona Game and Fish Department (AGFD). 2001a. *Athene cunicularia hypugea* Western burrowing owl. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona.

Arizona Game and Fish Department (AGFD). 2001b. *Pyrgulopsis bacchus* Grand Wash springsnail. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona.

Arizona Game and Fish Department (AGFD). 2001c. *Idionycteris phyllotis* Allen's lappet-browed bat. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona.

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

Arizona Game and Fish Department (AGFD). 2002b. *Eumops perotis californicus* Greater western mastiff bat. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona.

Arizona Game and Fish Department (AGFD). 2003a. *Euderma maculatum* Spotted bat. 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* Pale Townsend's big-eared bat. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona.

Arizona Game and Fish Department (AGFD). 20011. *Myotis occultus* Arizona myotis. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona.

Arizona Game and Fish Department (AGFD). 2013. *Anaxyrus microscaphus* Arizona toad. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona.

Arizona Game and Fish Department (AGFD). 2014. *Macrotus californicus* California leaf-nosed bat. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona.

Arizona Game and Fish Department (AGFD). nd. Guidelines for Wildlife Friendly Fencing. Available at: https://www.azgfd.com/PortalImages/files/HPC/110125_AGFD_fencing_guidelines.pdf. Accessed August 21, 2018.

Bailard JL and Moret GJ. 2017. Mojave Desert Network selected large springs: Tassi Spring benthic macroinvertebrate and springsnail data 2012 to 2016. Natural Resource Data Series. NPS/MOJN/NRDS—2017/1119. National Park Service. Fort Collins, Colorado

Belshaw, M. and E Peplow Jr. 1980. *Historic Resource Study, Lake Mead National Recreation Area, Nevada.* Historical Preservation Branch Pacific Northwest/Western Team, USDI, National Park Service, Denver Service Center.

Blalack, J, S.Wells, L.Bergstresser. 2004. Documentation and Trip Report, LAME 1999E Tassi Ranch and Springs Site, AZ A:9:131 (ASM) Grand Canyon-Parashant National Monument, Arizona. Unpublished report prepared by the USDI, National Park Service, Western Archeology and Conservation Center, Submitted to Lake Mead National Recreation Area.

Bradford, D.F., R.D. Jennings, and J.R. Jaeger. 2005. *Rana onca* Cope 1875, Relict leopard frog. Pp. 567–568 *in* M.J. Lannoo (ed). Status and conservation of U.S. amphibians. University of California Press, Berkeley, CA.

Collins, W.S. 2002. Cattle Ranching in Arizona, 1540-1950. Multiple Property Documentation Form, National Register of Historic Places. On file at Arizona State Historic Preservation Office, Lake Mead N.R.A. Cultural Files, and Grand Canyon-Parashant N.M. Cultural Files.

[Conservation Team] Relict Leopard Frog Conservation Team. 2005. Conservation agreement and rangewide conservation assessment and strategy for the relict leopard frog (*Rana onca*). Unpublished document, available at: http://www.fws.gov/nevada/es/documents/esa/Rana%20onca%20CAS%20Final.pdf

Deur, D., Lahoff R. and D. Confer. 2014. North Rim Homelands: An Ethnographic Overview and Assessment Relating to Tribes Associated with Grand Canyon-Parashant National Monument. Unpublished document. Prepared for National Park Service under TA J8W07090016.

Eakle, W.L. and T.G. Grubb. 1986. Prey Remains from Golden Eagle Nests in Central Arizona. *Western Birds* 17:87-89.

Jaeger, J.R. and R. Rivera. 2018. Relict Leopard Frog Monitoring and Management, 2018 Activity Report. School of Life Sciences, University of Nevada, Las Vegas.

Jennings, M.R. and M.P. Hayes. 1994. Decline of native ranid frogs in the desert southwest. Pp. 183–211 *in* P.R. Brown and J.W. Wright (eds), Herpetology of the North American Deserts, Southwestern Herpetologists Society, Special Publ. No 5.

Kearsley, M J, K. Green, M. Turkman, M Reid, M. Hall, T. Ayers and K. Christie. 2015. Grand Canyon National Park-Grand Canyon / Parashant National Monument vegetation classification and mapping project. Natural Resource Report. NPS/GRCA/NRR—2015/913. National Park Service. Fort Collins, Colorado.

Provencher S and Warner L. 2003. Tassi Ranch: Cultural Landscape Inventory, Grand Canyon - Parashant National Monument, National Park Service. Cultural Landscape Inventories. 725387. NPS Pacific West Regional Office.

Relict Leopard Frog Conservation Team. 2016. Conservation Agreement and Conservation Assessment and Strategy for the Relict Leopard Frog (Rana onca [=Lithobates onca]). Unpublished document, available at: http://www.ndow.org/uploadedFiles/ndoworg/Content/Our_Agency/Divisions/Fisheries/Relict-Leopard-Frog-Conservation-Agreement.pdf

Sada DW. 2005. Abundance, distribution, and habitat use of the Grand Wash springsnail (Pyrgulopsis bacchus), Grand Canyon-Parashant National Monument, Arizona. Desert Research Institute. Reno, Nevada.

U.S. Department of Agriculture. 2018. Ecological Site Description. https://esis.sc.egov.usda.gov/Welcome/pgApprovedSelect.aspx. Accessed May 9, 2018.

U.S. Department of Agriculture. NRCS. 2018. The PLANTS Database (http://plants.usda.gov, 17 September 2018). National Plant Data Team, Greensboro, NC 27401-4901 USA.

U.S. Department of the Interior. Bureau of Land Management (BLM). 2017. Updated Bureau of Land Management (BLM) Sensitive Species List for Arizona. https://www.blm.gov/policy/az-im-2017-009.

U.S. Department of the Interior. Bureau of Land Management. 2008. Grand Canyon-Parashant National Monument: record of decision, approved resource management plan. St. George, Utah.

U.S. Department of the Interior. Bureau of Land Management. 1989. H-1741-1 – FENCING.

U.S. Department of the Interior. National Park Service. 1996. The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes. Birbaum, C.A. ed. Washington, D.C. 36 CFR 68.

U. S. Department of the Interior. National Park Service. 2013. Tassi Ranch Cultural Landscape Report Historic Structures Report Grand Canyon-Parashant National Monument. Unpublished Report, available at: https://irma.nps.gov/DataStore/Reference/Profile/2255901

U. S. Department of the Interior. National Park Service. 2006. Management policies 2006. Available at: https://permanent.access.gpo.gov/LPS113931/LPS113931/www.nps.gov/policy/MP2006.pdf.

U. S. Department of the Interior. National Park Service and Bureau of Land Management. 2007. Tassi Ranch and Springs interim treatment plan.

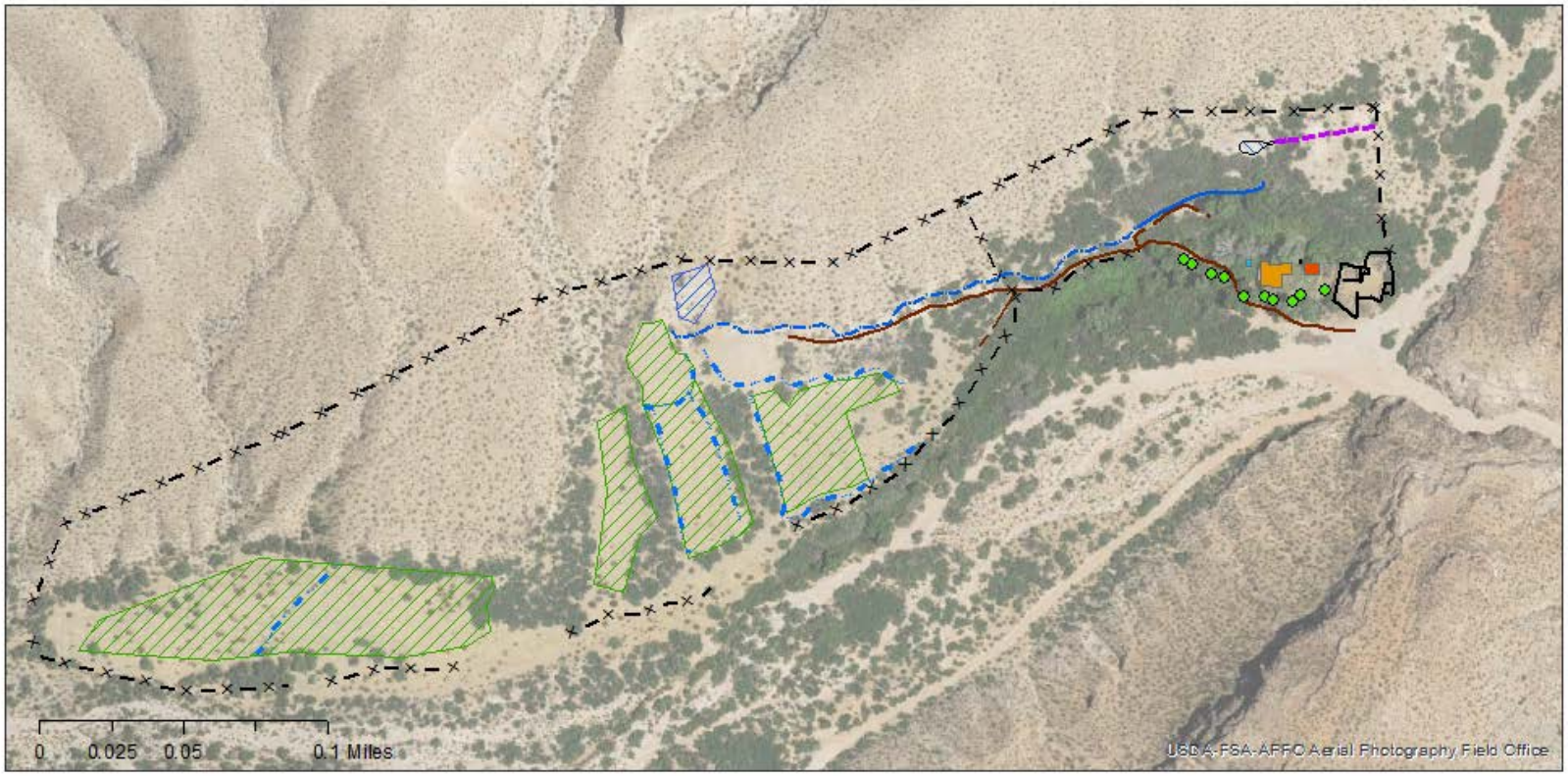
U.S. Department of the Interior. National Park Service (NPS) and U.S. Fish and Wildlife Service (USFWS). 2010. Memorandum of Understanding (MOU) between the U.S. Department of the Interior National Park Service and the U. S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds. Washington D.C.

U. S. Department of the Interior. U.S. Fish and Wildlife Service (USFWS). 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. Online version available at: http://www.fws.gov/migratorybirds/

APPENDIX A

Maps

Map A-1. Tassi Ranch Site Management Plan Cultural Landscape Contributing Elements
NEPA Number PEPC-79750/DOI-BLM-AZ-A030-2018-0006
Department of the Interior - National Park Service - Grand Canyon-Parashant National Monument



Shed
House
Barn
Cottonwood Row
Agricultural Fields
Corral
Mixed Media Fence
Main Ranch Road
Secondary Ranch Road

Functioning Ditch or Springbrook
Nonfunctioning Main Ditch
West Dry Ditches
East Dry Ditch
Dry East Pond
Dry West Pond
Spring Box 1
Stock Tank

Map Produced by BLM Arizona Strip District
File: TassiEA_ContributingElements_20180905.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 1:3,425 at 8.5x11 page output
User: jefox
Date: 9/5/2018

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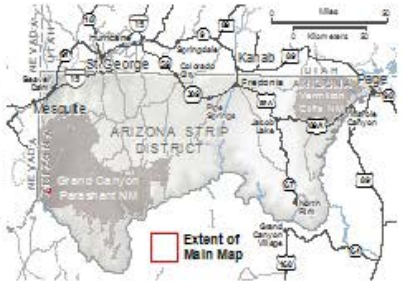
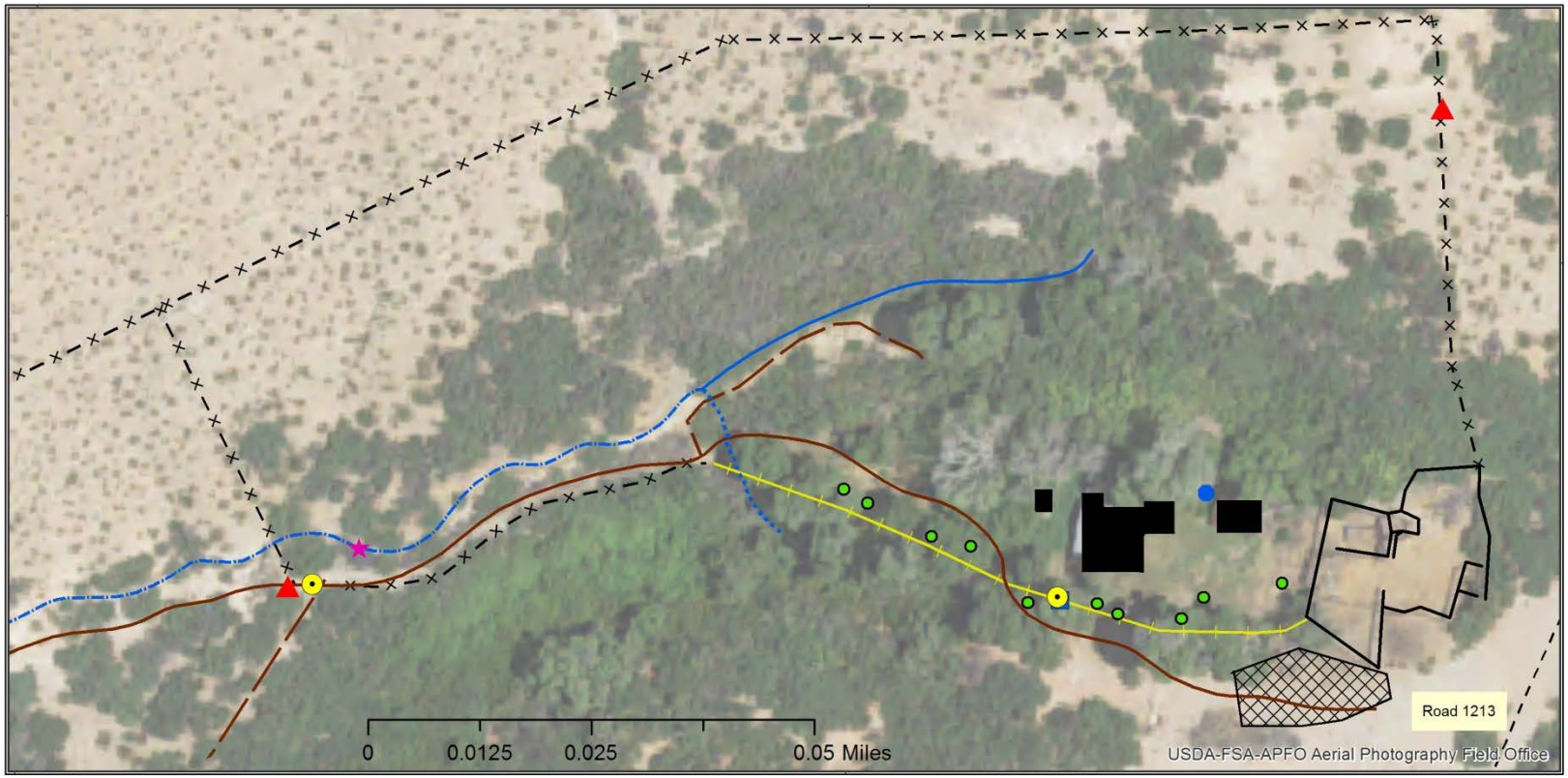


Map A-2. Tassi Ranch Site Management Plan Ranch Core
NEPA Number PEPC-79750/DOI-BLM-AZ-A030-2018-0006
Department of the Interior - National Park Service - Grand Canyon-Parashant National Monument



NPS Road

Modern
- Modern Fence
- Parking Area
- Gate
- Stile
- Breach Flow To Wash
- Approximate Location of New Breach

Historic
- Building
- Main Ranch Road
- Secondary Ranch Road
- Historic Fence
- Cottonwood Tree
- Ditch/Springbrook
- Dry Ditch
- Corral
- Trough
- Springbox

Map Produced by BLM Arizona Strip District
File: TassiEA_RanchCoreMap_20180905.mxd
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Reference System: U.S. PLSS GSRB&M
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User: jefox
Date: 9/5/2018

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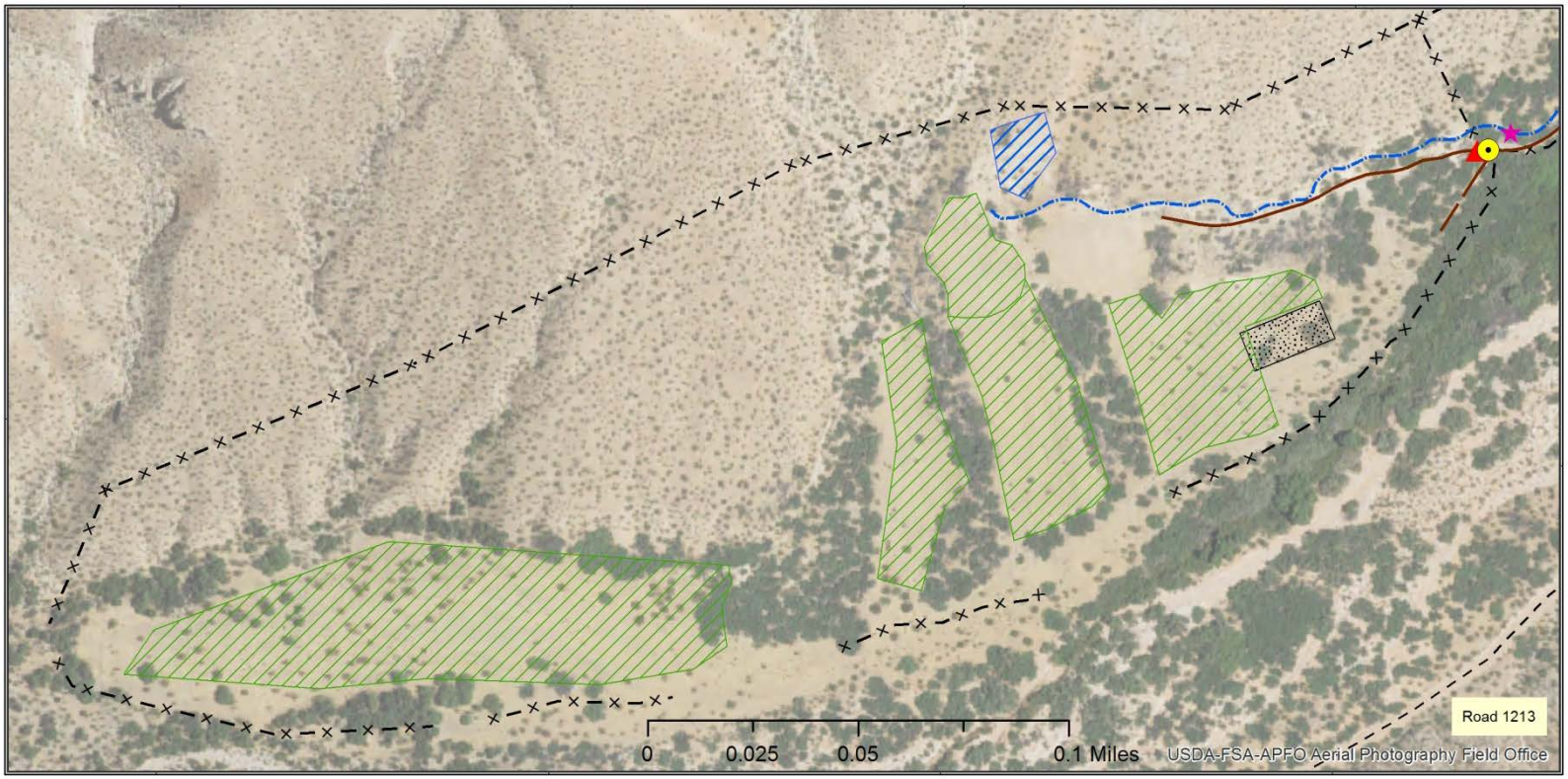
Map A-3. Tassi Ranch Site Management Plan Ranch Fields
NEPA Number PEPC-79750/DOI-BLM-AZ-A030-2018-0006
Department of the Interior - National Park Service - Grand Canyon-Parashant National Monument



NPS Road

Modern
- Gate
- Stile
- Approximate Location of New Breach
- VegetationExclosure

Historic
- Dry Ditch
- Main Ranch Road
- Secondary Ranch Road
- Historic Fence
- Agricultural Fields
- Dry Pond

Map Produced by BLM Arizona Strip District
File: TassiEA_RanchField_20180905.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
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User: jefox
Date: 9/5/2018

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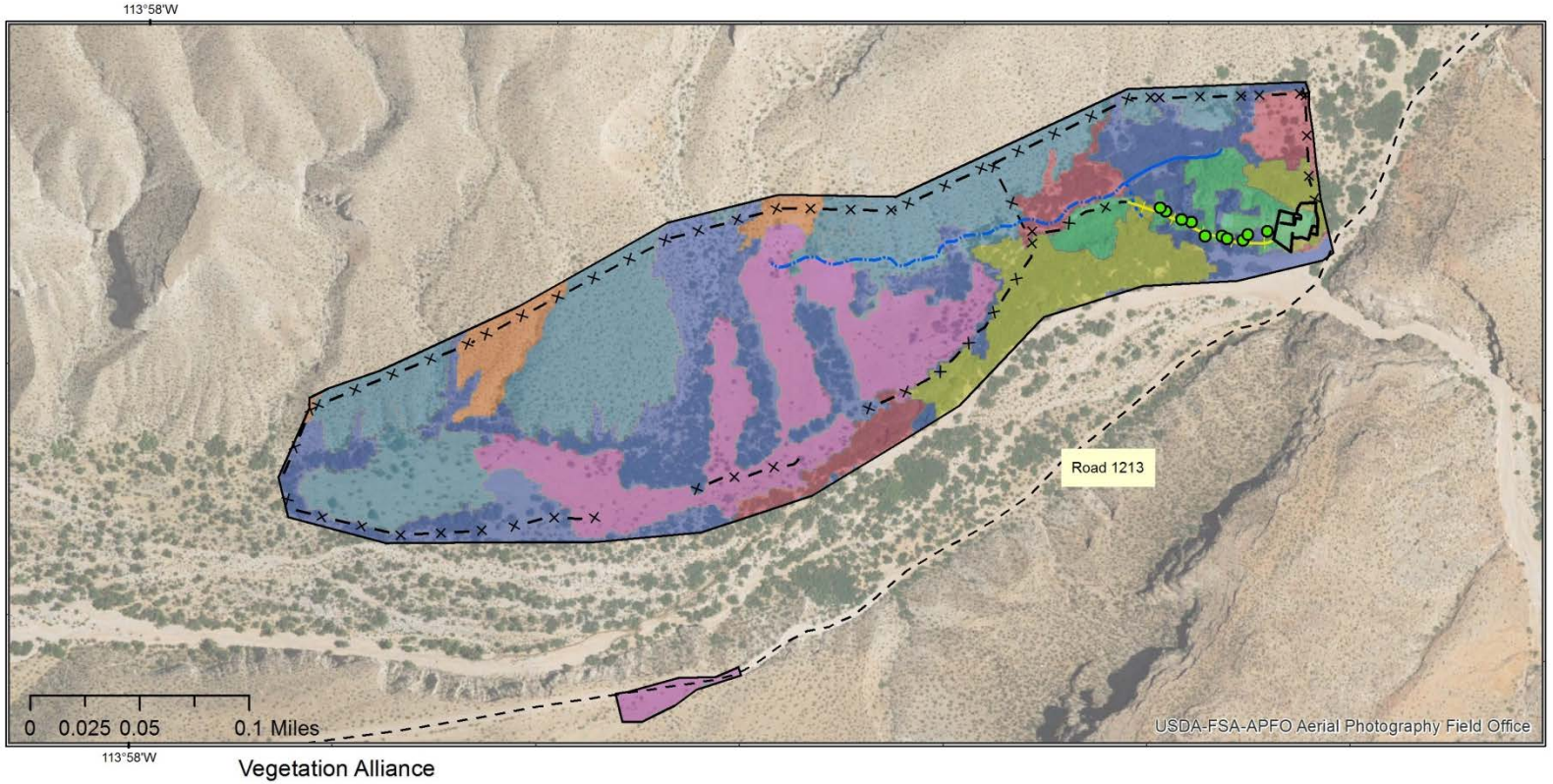
Map A-4. Tassi Ranch Site Management Plan Vegetation Map
NEPA Number PEPC-79750/DOI-BLM-AZ-A030-2018-0006
Department of the Interior - National Park Service - Grand Canyon-Parashant National Monument



Vegetation Alliance

- NPS Road
- Dry Ditch
- Ditch/Springbrook
- Historic Fence
- Corral
- Modern Fence
- Cottonwood Tree

- Acacia greggii Shrublands
- Baccharis spp. - Salix exigua - Pluchea sericea Shrubland Alliance
- Larrea tridentata - Ambrosia spp. Shrubland Alliance
- Larrea tridentata - Encelia spp. Shrubland Alliance
- Populus fremontii - Salix gooddingii Woodland Alliance
- Prosopis glandulosa var. torreyana Shrubland
- Unvegetated Surfaces and Built Up Areas

Map Produced by BLM Arizona Strip District
File: TassiEA_VegMap_20180905.mxd
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
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User: jefox
Date: 9/5/2018

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APPENDIX B

Individual Component - Identified Deficiency, Proposed Treatment and Goal

The following table was modified from the FMSS spreadsheet at the end of the Tassi Ranch CLR. Contributing and non-contributing HS and LE as well as some modern infrastructure are listed in the table. Each asset or asset component is listed with its size (Qty = quantity, unit = unit of measurement), deficiency from desired condition as determined in 2013, detailed stabilization or treatment recommendation, and long-term goal. Since 1013, some of these deficiencies or new deficiencies have been addressed. See Appendix F for more information and a discussion of modifications to the CLR recommendations in the Site Management Plan (SMP).

The following units of measurement are used:
SF: square foot
LF: linear foot
EA: each
AC: acre

Asset Name	Qty	Unit	Deficiencies	Stabilization and/or Treatment	Goal
Barn (Historic)/ Chicken Coop	100	SF	The chicken coop is in immediate threat of loss. Removal of vegetation and litter with minimal restoration is necessary to preserve the footprint and basic form of the chicken coop and nesting area.	• Clear vegetation and other debris away from remaining structure. • Photo document and produce as- built scale drawings of remaining structure. • Annually remove vegetation	Stabilize the remnant structure.
Barn (Historic)- Foundation/ Exterior Walls	408	SF	Groundwater saturates the soils around the foundation of the barn causing some of the railroad ties to separate from each other.	• Add 1x bracing to the interior walls to stabilize. • Annually inspect the structural integrity of the building and repair with in-kind materials as necessary.	Correct the issue and stabilize the structure.
Barn (Historic)- Roof	408	SF	No current deficiencies.	• Annually 1) clear any debris from roof, 2) inspect the roof, and 3) repair with in-kind materials as needed.	----
Dry Ditches and Holding Ponds	650	LF	Woody vegetation is growing in the dry ditch, making it difficult to identify and impacting integrity.	• Flush cut all herbaceous and woody vegetation growing in the dry ditch, ditch wall, and to 5 feet up the ditch back slope. • Remove all debris from site. • Annually inspect non-functioning ditch for colonizing woody vegetation. Flush cut any woody vegetation emerging within the ditch or ditch wall.	Stabilize and preserve the dry ditch as a non-functioning historic feature. Ditch and ditch wall can be covered in herbaceous vegetation, but should not be colonized with woody plants.

Asset Name	Qty	Unit	Deficiencies	Stabilization and/or Treatment	Goal
Entry/Parking Area	14,000	SF	Encroachment of mesquite trees into the area between Pigeon Wash and the ranch yard prevents historically open views to Pigeon Wash and the canyon ridge from ranch house, and parking area.	• Flush cut mesquite shrubs on ranch- side of revetment, and within entry/parking area. • Every 2-3 years, flush cut new emergent mesquite vegetation on ranch-side of revetment and in entry/parking area. Thin vegetation between Pigeon Wash and ranch yard. Cut stumps level with ground. • Every 5 years, parking area should be re- graded and gravel added as needed to maintain a level surface.	Thin vegetation growing between Pigeon Wash and the ranch yard to reestablish more open views while protecting the area from vehicle traffic.
Functioning Ditch	495 (228 current)	LF	Overgrown herbaceous and woody vegetation--such as cattails and arrow weed that clog the ditches and damage ditch walls.	• Only work on one-third of functioning ditch per year in order to maintain aquatic habitat. • Annually flush cut all herbaceous and woody vegetation growing in 33% of the functioning ditch and ditch wall, and to 5 feet up the ditch back slope using a weed hog trimmer blade or brush blade. • Remove all debris from site. • Re-contour brushed ditch using a small excavator or track hoe, preferably with an offset arm. Excavate ditch to create a 1-3 ft. wide, flat-bottom ditch, with variable depth. Grade running slope of ditch bottom with minimum 1:100 gradient, to allow positive flow always from springs. Place excavated material on ditch wall. Compact wall material to achieve a stable berm to retain ditch water. • Preferred timing is outside amphibian spawning season. • Repair rodent burrows and breaches in the wall of the ditch using compacted material.	Clear and re-contour ditches to 1) allow water flow, while protecting amphibians, and 2) relocate breach to a more suitable location that will minimize erosion and increase aquatic habitat.
House (Historic) - Bathroom	140	SF	The floor in the bathroom addition is moist and has scattered debris.	• Clean any debris or litter and follow with seasonal cleaning.	Correct the issue and stabilize the

Asset Name	Qty	Unit	Deficiencies	Stabilization and/or Treatment	Goal
Addition				• Add layer of pea gravel. • Annually clear debris from the building.	structure.
House (Historic) - Exterior Walls	1,512	SF	Although structurally sound, previous repairs to the mud and concrete mortar have been applied in a manner that obscures the field-stone and changes the character of the mortar joints.	• Research and document previous repair work including mortar mixture formula. • Unlike the main house, the mortar of the bathroom is cement based. • Repair any missing or heavily cracked mortar. • Correct recent inappropriate repairs (excessive mortar in joints, discoloration of stone caused by excessive mortar) as part of needed future repairs. • Annually monitor mortar for cracks and deterioration, repoint with matching mortar mixture formula as needed.	Assure when repairs are needed, appropriate mortar mixtures are used and applied by skilled masons.
House (Historic) - Windows and Doors	6 Doors, 12 Windows	EA	There are seven window openings in the ranch house in different states of repair. Of the six doors in the house, four are working; two are in need of repair. The two in need of repair are located in the northwest room and the entrance to the bathroom.	• Photograph and document the current condition and measurements of each door and window. • Repair all doors making them operational for use. Keep doors closed when not in use to help provide needed stability. • Replicate new sash using remaining historic sash as the template. Rehabilitate any existing sash with replacement parts as needed. • Clean existing screen openings to provide maximum air movement and ventilation. • Annually 1) inspect windows and doors, and repair within in-kind materials, and 2) clean screen openings to provide maximum ventilation.	Repair and stabilize the structural components of the ranch house.

Asset Name	Qty	Unit	Deficiencies	Stabilization and/or Treatment	Goal
House (Historic) - Floors	1,512	SF	Interior carpet remains in the northwest room of the ranch house. There is some old construction material and wood debris stored inside the building. There is also 2x lumber on the floor that appears to be used as walkways when there is standing water in the rooms.	• Remove all carpeting, lumber, and building materials currently being stored in the structure. • Place 2 inches of pea gravel in northeast and northwest rooms. • Annually clear any debris accumulating in the building that might attract pests or create wet conditions.	Remove materials that retain moisture and create damp conditions in the house.
House (Historic) - Roof	1,512	SF	The roof is loose in some places and the gable end fascia boards have separated, leaving the roof susceptible to wind damage.	• Retain the historic metal roof and resecure loose panels using appropriate hardware to avoid loss or deterioration. Re-attach loose boards at eaves with 10d common nails. • Inspect roofing system for damage by remove rake edge roofing. Use six-inch heavy duty wood screws to secure gable end fascia pieces and remove added metal ties. • Annually inspect roof and repair within in-kind materials.	Stabilize and preserve the roof.
Pigeon Wash Revetment/ Channel	35,000	SF	The current location of the active flood channel in Pigeon Wash has the potential to scour and undercut the revetment.	• Relocate active flood channel away from toe of revetment by re- contouring Pigeon Wash. A Corps of Engineers Permit is needed for this work. Construct and maintain a new flood channel by excavating a 3-5 ft. deep, flat-bottom channel, 5-10 ft. wide near the center of Pigeon Wash, parallel to the entry/parking area revetment. Preferred timing is in dry conditions. • After flood events inspect and repair revetment as needed.	Stabilize the revetment to assure safety and prevent loss.

Asset Name	Qty	Unit	Deficiencies	Stabilization and/or Treatment	Goal
Ranch Core Protection Fence (Historic)	1,610	LF	Fence across ranch road is showing wear.	• Construct a peeled juniper or mesquite gate where the fence crosses the ranch road and relocate the existing stile adjacent to the gate. • Repair ranch core protection fence by resetting leaning posts, replacing deteriorated posts, and tightening or re-stranding 3-strand wire. Re- use existing components where possible. Retain the form and materials of the fence design where component replacement is needed. • Replace posts and 3-strand wire in-kind when replacement is necessary. • Annually inspect ranch core fence and make repairs as needed to prevent livestock and feral animal access to the ranch core.	Maintain the historic character of the fence and ensure it functions to restrict feral livestock from the ranch core.
Ranch Corral	9500	SF	Some fence rails comprising the corral are split, loose, or detached from posts; the north (rear) and east (right side) corral fence panels are partially collapsed and becoming overgrown with vegetation.	• Repair corral fencing by replacing split or deteriorated posts and rails or re-attaching loose rails. Use existing and salvaged materials where possible, or replace in-kind. Replicate the existing methods of attachment as possible. • Establish a 5-10 foot wide vegetation-free zone on the exterior of the corral by flush-cutting woody shrubs and brush-hogging or weed whacking vegetation. Remove woody debris • Annually maintain the vegetation- free zone on the exterior of the corral by brush hogging or weed whacking. • Every 3-5 years, replace any damaged or deteriorated corral posts or rails with similar material. Re-attach any detached rails with the same method of attachment.	Repair and stabilize the corral.
Ranch Cottonwood Row	9	EA	Dead, declining, or missing trees in cottonwood row, accumulated deadwood, and tree cavities.	• Prune (by certified arborist) all cottonwood row trees to remove attached and hanging deadwood. Thin and reduce the size of canopies to balance	Limb and thin-out crowns to reduce windsail effect and

Asset Name	Qty	Unit	Deficiencies	Stabilization and/or Treatment	Goal
				weight and reduce the windsail effect. • A bucket truck or high-lift is recommended for canopy access. • Remove dead or dying cottonwoods and replace with trained suckers at base of trees (where existing) or new rooted cuttings of the same species. • Supplemental water (drip irrigation) must be supplied to young trees until root establishment (2-3 years). • Every 3-5 years, prune (by certified arborist) all cottonwood row trees to remove any damaged, diseased or deadwood. Shape canopies of young replacement trees to balance canopy and reduce windsail effect.	gradually replace cottonwood row with a combination of trained suckers or rooted cuttings of the same species.
Ranch Fields	8.3	AC	Woody vegetation is encroaching in the ranch fields.	• Flush-cut all young woody shrubs - less than 3" in diameter trunk, growing within and around the perimeter of the ranch fields. Stumps should be flush with the ground. • Remove exclosure fence from long-term monitoring plot and woody vegetation within if Lake Mead NRA specialists are no longer monitoring vegetation. • Every 3-5 years, remove all young woody shrubs - less than 3" in diameter trunk, growing within and around the perimeter of the ranch fields by brush hogging or flush cutting.	Maintain to the degree possible, the open character and historic extent of the ranch fields.
Ranch Perimeter Fence (Historic)	4450	LF	Approximately 1/3 of the north perimeter fence is in poor condition and needs repair. Most of south fence needs repair.	• Repair ranch perimeter fence by re- setting fallen and leaning posts, and re-stranding and tightening 3- strand wire. Existing materials should be salvaged and re-used to the extent possible. Replace juniper/mesquite wood or metal posts in-kind, where replacement is	Repair and preserve the integrity of the fence.

Asset Name	Qty	Unit	Deficiencies	Stabilization and/or Treatment	Goal
				necessary. • Annually inspect ranch perimeter fence and make repairs as needed, to ensure viable fence.	
Ranch Road (Previously Wash Road)	1220	LF	Overgrown vegetation is obscuring of approximately 75% of the two-track road through ranch. Water from a breach is eroding of the road prism.	• Clear alignment of Tassi Wash (ranch) Road by removing overgrown vegetation. Reestablish a 8-10 feet width for the road using a brush hog/brush blade and weed wacker. • Relocate breach in the functioning irrigation ditch to new location. • Grade road in eroded prism areas to reestablish road terrace. Place gravel fill in eroded areas and compact to achieve a drivable-road bed for admin vehicles and heavy equipment. • Construct new gate and relocate stile crossing with lockable single leaf equipment gate (see core protection fence). • Relocate fence ladder (stile) beside new equipment gate to permit hiker access. • Annually, maintain Tassi Wash Road by clearing encroaching vegetation using a brush hog, brush blade, and weed wacker. Retain a 8-10 foot. corridor for the two-track road. • Every 3-5 years, repair any eroded or slumped areas of the road prism with imported gravel.	Stabilize and preserve the historic road.
Ranch Yard	1	AC	Overgrown herbaceous and woody vegetation, including young trees, are growing too close to historic structures.	• Brush hog or weed-wack vegetation in the ranch yard to ground level. Flush-cut young trees growing within 10 feet of structures. • Avoid damaging the roots of mature shade trees. • Preferred timing is early spring, before non-native plant materials seed and disperse. • Coordinate work with Exotic Plant Management Team. • At least twice during the growing season,	The goal for treatment is to reestablish a low herbaceous ground cover (less than 6" tall), with no woody plants, except mature shade trees and

Asset Name	Qty	Unit	Deficiencies	Stabilization and/or Treatment	Goal
				(minimally at the beginning and end), using a low-set brush hog, or a weed wacker to maintain a low, herbaceous groundcover less than 6" tall. • Allow herbaceous debris to remain as a mulch cover.	shrubs (a minimum of 10 feet from structures).
Ranch Yard Fence and Gates	310	LF	Sections of the fence protecting the ranch yard from intrusion by feral livestock are in poor condition. In addition, the existing worm fence on the south side of the ranch yard is compatible, but is different in design and character to the historic fence.	• Replace welded wire sections with peeled juniper or mesquite gates that match the historic character of the site . • In 3-5 years replace existing fence with a peeled Juniper or Mesquite pole fence, based on the style of the historic fence panel near the stock tank. • Every 3-5 years, replace any split or deteriorated posts or rails with similar form and materials. • Re-attach any detached rails with the same method of attachment.	Short term: repair or replace sections of the fence in poor condition to ensure a viable barrier to livestock. Long term: reestablish a fence that is more historic in character, matching historic fence panel near stock tank.
Ranch Yard Trees	11	EA	Deficiency is accumulated deadwood in willow trees and cottonwood trees, and limbs from both overhanging historic structures.	• Prune (by certified arborist) all ranch yard trees to remove deadwood. • Thin and reduce the size of tree canopies to balance weight and reduce the windsail effect. • Remove limbs that are overhanging the historic ranch structures. • A bucket truck or high-lift is recommended for canopy access, however, trees may be scaled by an arborist with safety harness. • Every 3-5 years, prune (by certified arborist) all ranch yard trees to remove any damaged, diseased or deadwood, and remove any limbs overhanging historic ranch structures.	Remove deadwood from canopies, and limb-up and thin canopies to reduce windsail effect.

Asset Name	Qty	Unit	Deficiencies	Stabilization and/or Treatment	Goal
Shed (Historic) - Floors	100	SF	The interior floor and areas immediately around the shed remain wet, allowing vegetation to grow inside the building.	• Remove encroaching vegetation and other debris from the building interior. • Cover interior floor with geotextile fabric pinned at the corners. • Add pea gravel to the interior and exterior perimeter to inhibit plant growth and help drainage. • Annually clear any debris from the building.	Correct the water issue and stabilize the structure.
Shed (Historic)- Foundation/ Exterior Walls	100	SF	The building is leaning five degrees to the west.	• Straighten building back to plumb with springboards or jacks and connections. • Inspect lower boards and bottom of wall studs. • Replace where necessary with in-kind material or sistering new members to the original. • After plumbing building add diagonal bracing to north interior wall to help eliminate racking. • Annually inspect the structure and repair with in-kind materials as necessary.	Stabilize the structure.
Shed (Historic)- Roof	100	SF	Willow limbs from an adjacent tree rest on the roof, some roof material is missing and there are a few deteriorated rafters.	• Repair/replace roll roofing w/ material to match exiting green material. Inspect sheeting and repair or replace where necessary. Refasten at each roof rafter with 8d hot dipped galvanized common nail. Repair any broken rafter tails with discreet 1x sistering and additional screws through roof sheathing. • Annually 1) clear any debris from roof, 2) inspect the roof, and 3) repair with materials in-kind as needed.	Repair and stabilize the structure.

Asset Name	Qty	Unit	Deficiencies	Stabilization and/or Treatment	Goal
Shed (Historic)- Windows and Doors	1 Door, 2 Windows	EA	Window and door openings require repair and replacement of missing components.	• Refasten remaining screens. • Repair or replace with in- kind material where missing. • Reconstruct door and install to help prevent racking. • Annually 1) inspect windows and doors, and repair within in-kind materials, and 2) clean screen openings to provide maximum ventilation.	Stabilization of the historic structure.
Springs Drainage System (non-historical contribution) - Yard Drainage System	NA	NA	The French drain system does not appear to be draining the saturated soils upslope from the shed and barn.	• Use a cable snake or pressure washer to clean out the existing French drain system and ensure that the lines are free flowing. • If expanded French drain system fails to fully capture surface flows, excavate two, 18-24 inch wide ditches approx. 18-24 inches below grade that cross the slope behind the barn and shed and convey ground water away from the structures. Ensure that the ditches have sufficient slope to convey water downhill. • Biannually inspect the ditches and repair, as needed, to ensure that it is clear of vegetation, debris, and that water can flow freely.	Repair the French drain system and plan for a back- up new surface ditch system if necessary.
Springs Drainage System (non-historical contribution)- Stock Tank	1	EA	The hose that once supplied water from the springs to the tank is either clogged or punctured. The tank is no longer flushed with clean water and tends to fill with debris and stagnates.	• Bury any exposed sections of the hose so they do not pose a tripping hazard. • Puncture a hole in the base of the stock tank and ensure that it drains completely and does not contribute to a pest management problem (mosquito breeding pond). • Work with natural resources staff to ensure the timing and repairs will maintain relict leopard frog habitat. • Annually inspect the tank to ensure it does not continue to fill with water and create conditions	Preserve the tank as a non-functioning feature.

Asset Name	Qty	Unit	Deficiencies	Stabilization and/or Treatment	Goal
				for mosquitos.	
Springs Drainage System- Spring Box #2	1	EA	No current deficiencies.	• Annually 1) clear encroaching vegetation within approx. 10 feet around the structure, 2) inspect the stone masonry structure and repair as needed using materials in-kind. • Vegetation debris may be left on the ground as mulch.	Stabilize and repair the structure.
Springs Drainage System-Spring Box #1	1	EA	Spring box #1 does not appear to effectively capture all the water from spring seepage. The soil remains heavily saturated around the box and is impacting the barn.	• Clean and repair spring box structure: 1) pump water out of the basin of the spring box; 2) remove any debris or excess soil from the interior of the structure; 3) inspect outfall pipes for any cracks, breaks, or failure points; 4) repair the outfall to ensure a watertight seal between the box and the pipe; 5) seal the below ground concrete box walls with hydraulic cement; and 6) inspect and re-point the above ground stone masonry structure as needed with a matching mortar mix. • Annually inspect the interior structure, stone masonry, and wood hatch and repair as needed with materials in-kind.	Stabilize the structure and increase function.

APPENDIX C

Images

Figure C-1. Tassi Ranch house looking southwest on February 5, 1947. Note the bathhouse addition had not yet been built. Vegetation around the house was low grasses and scattered cottonwood trees. Ground level sloped gently up away from the house to the north.

Figure C-2. Similar view as C-1 on July 31, 2018. Note the addition of the bathhouse to the house. Since 1947, large shrubs have encroached on the ranch yard and the gentle slope to the north has shifted up against the back of the house.

Figure C-3. Tassi Ranch house looking west on February 5, 1947. The ranch road is visible in the left lower corner. View behind the house to the west shows a continuation of the open ranch yard and scattered trees up the slope.

Figure C-4. Tassi Ranch house looking west on July 31, 2018. Note the addition of the bathhouse to the house. Since 1947, the ground level of the ranch yard has risen due to the accumulation of silt from flooding, soil from ground excavations and organic matter from decaying vegetation. As can be see, the encroachment of shrubs and trees into the ranch yard is not limited to just next to the ranch house.

Figure C-5. Tassi Ranch Core looking northeast across Pigeon Wash on February 5, 1947. Note the small section of split rail fence visible in front of the ranch house. This fence was no longer apparent by 1998. The location of the current parking area is obscured by shrubs growing in the wash.

Figure C-6. Key Observation Point 1.

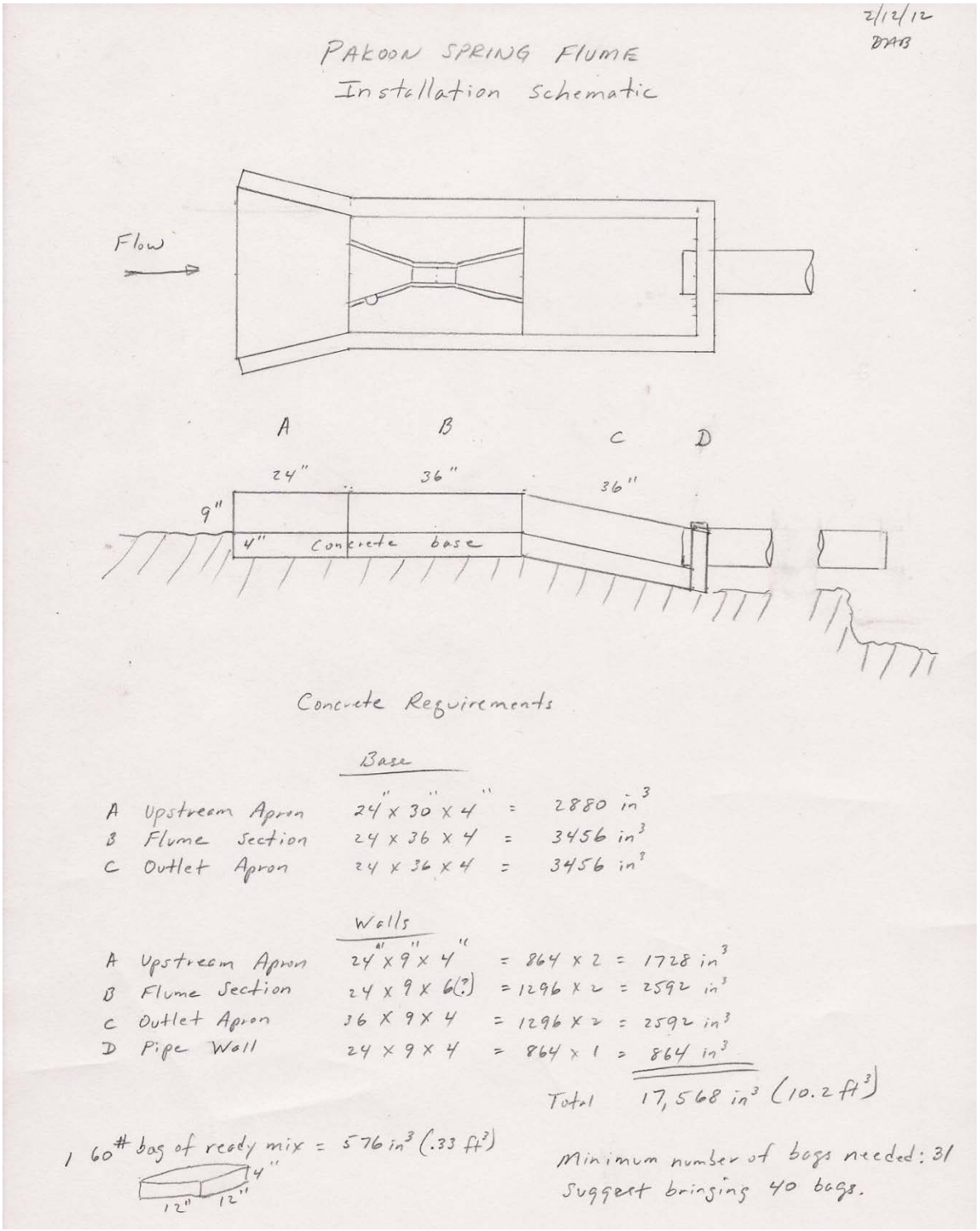
Figure C-7. Key Observation Point 2.

Figure C-8. Key Observation Point 3.

APPENDIX D

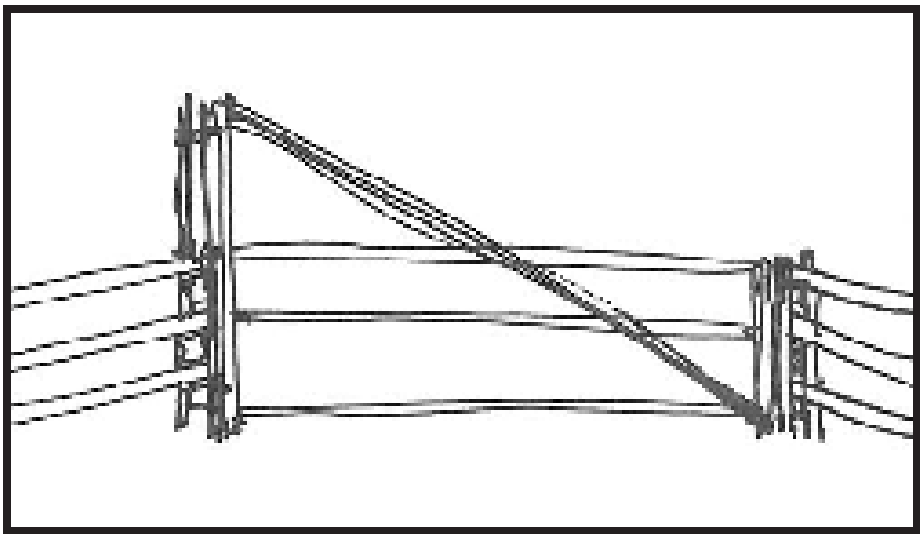
Schematic Drawings

Weir/flume:



Design from 2012 of similar flume at nearby Pakoon Springs.

Image of similar flume installed at Pakoon Springs in 2018.



Proposed service gate design for new split rail fence in front of house.

APPENDIX E

Visual Contrast Rating Worksheets

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 5/2/2018

District/ Field Office: Arizona Strip District
Grand Canyon-Parashant National Monument

Resource Area: Tassi Ranch Cultural Landscape

Activity (program): Recreation

SECTION A. PROJECT INFORMATION

1. Project Name Tassi Ranch CLP EA	4. Location Township 33N	5. Location Sketch: KOP 1.jpg, Figure C-6
2. Key Observation Point #1	Range 16W	
3. VRM Class **1**	Section 13	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat, sloping in the background	Medium to tall brush and trees, short grasses	Square buildings, horizontal vertical lines, fence posts
LINE	Regular	Linear cottonwood trees, conical brush, hard lines from trees	Straight, parallel, hard
COLOR	Brown hues	Green, brown, yellow	Brown, red, dark, black
TEX-TURE	Simple, directional in background	Dense	Contrasting

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM			
LINE			
COLOR			
TEX-TURE			

SECTION D. CONTRAST RATING __SHORT TERM __LONG TERM

1. DEGREE OF CONTRAST		FEATURES											
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMEN	FORM			X			X				X		
	LINE			X			X				X		

2. Does project design meet visual resource management objectives? X Yes ___No
(Explain on reverses side)

3. Additional mitigating measures recommended
___Yes X No (Explain on reverses side)

	COLOR			X							X			Evaluator's Names Braden Yardley 5/2/2018 Date
	TEXTURE			X				X				X		

SECTION D. (Continued)

Comments from item 2.

Additional Mitigating Measures (See item 3)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 5/2/2018

District/ Field Office: Arizona Strip District
Grand Canyon-Parashant National Monument

Resource Area: Tassi Ranch Cultural Landscape

Activity (program): Recreation

SECTION A. PROJECT INFORMATION

1. Project Name Tassi Ranch CLP EA	4. Location Township 33N	5. Location Sketch KOP 2.jpg, Figure C-7
2. Key Observation Point #2	Range 16W	
3. VRM Class 1	Section 13	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Long sloping, gentle on west, rugged on east, diverse patchy and solid on bottom	Small brush, long trees, conical tops,	Square house, linear fence
LINE	Strong converging	Medium, irregular, broken patchy on hills	Parallel and straight
COLOR	Tan, yellow in foreground, reds in background, monotone cliffs to west, dark hues on top to monotone on east	Green during spring, summer, brown during fall, spring and summer dark vivid greens, brown hues in fall	Dark brown, red roof
TEX-TURE	Directional, median	Dotted, clumped in bottom hills uniform in bottom	Directional

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM			
LINE			
COLOR			
TEX-TURE			

SECTION D. CONTRAST RATING __SHORT TERM __LONG TERM

1. DEGREE OF CONTRAST		FEATURES											
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMEN	FORM			X			X					X	
	LINE			X			X					X	

2. Does project design meet visual resource management objectives? X Yes ___No
(Explain on reverses side)

3. Additional mitigating measures recommended
___Yes X No (Explain on reverses side)

	COLOR			X		X						X		Evaluator's Names Braden Yardley 5/2/2018 Date
	TEXTURE			X				X				X		

SECTION D. (Continued)

Comments from item 2.

Additional Mitigating Measures (See item 3)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 5/2/2018

District/ Field Office: Arizona Strip District
Grand Canyon-Parashant National Monument

Resource Area: Tassi Ranch Cultural Landscape

Activity (program): Recreation

SECTION A. PROJECT INFORMATION

1. Project Name Tassi Ranch CLP EA	4. Location Township 33N	5. Location Sketch KOP 3.jpg, Figure C-8
2. Key Observation Point #3	Range 16W	
3. VRM Class 1	Section 13	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat in the foreground, gentle rolling hills and a long ridge in the background	Small brush low lying brush	Weak linear line from airstrip
LINE	Weak lines along rolling hills, rugged ridge in the background	Medium, irregular, broken patchy on hills	Parallel and straight
COLOR	Tan hues on rolling hills, dark browns and blacks along ridge	Green during spring, summer, brown during fall, spring and summer	Tan
TEX-TURE	Smooth along hills, coarse along ridge	Dotted, clumped along rolling hills	Directional

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM			
LINE			
COLOR			
TEX-TURE			

SECTION D. CONTRAST RATING __SHORT TERM __LONG TERM

1. DEGREE OF CONTRAST		FEATURES											
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMEN	FORM			X			X			X			
	LINE			X			X			X			

2. Does project design meet visual resource management objectives? X Yes ___No
(Explain on reverses side)

3. Additional mitigating measures recommended
___Yes X No (Explain on reverses side)

	COLOR			X		X				X				Evaluator's Names Braden Yardley 5/2/2018 Date
	TEXTURE			X				X				X		

SECTION D. (Continued)

Comments from item 2.

Additional Mitigating Measures (See item 3

APPENDIX F

Proposed Actions that Differ from Cultural Landscape Report Recommendations

This Site Management Plan (SMP) builds upon the recommendations from the Cultural Landscape Report (CLR) by incorporating changes to the site since the report was finalized in January 2013 and considerations about public use and safety as well as habitat requirements for special status species found at the site, site monitoring and local geological and topographic status. The departures between the plan and the report will be highlighted by location within the cultural landscape. A brief discussion of the alignment of the departures with the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes is included in Table F-1.

Parking Area

According to the CLR, the parking area was to be reconfigured to encourage visitor parking to the east and south, shifting the available parking to near the corral. This has already happened, though not to reduce erosion or maintain a more historic setting, the justification given in the CLR.

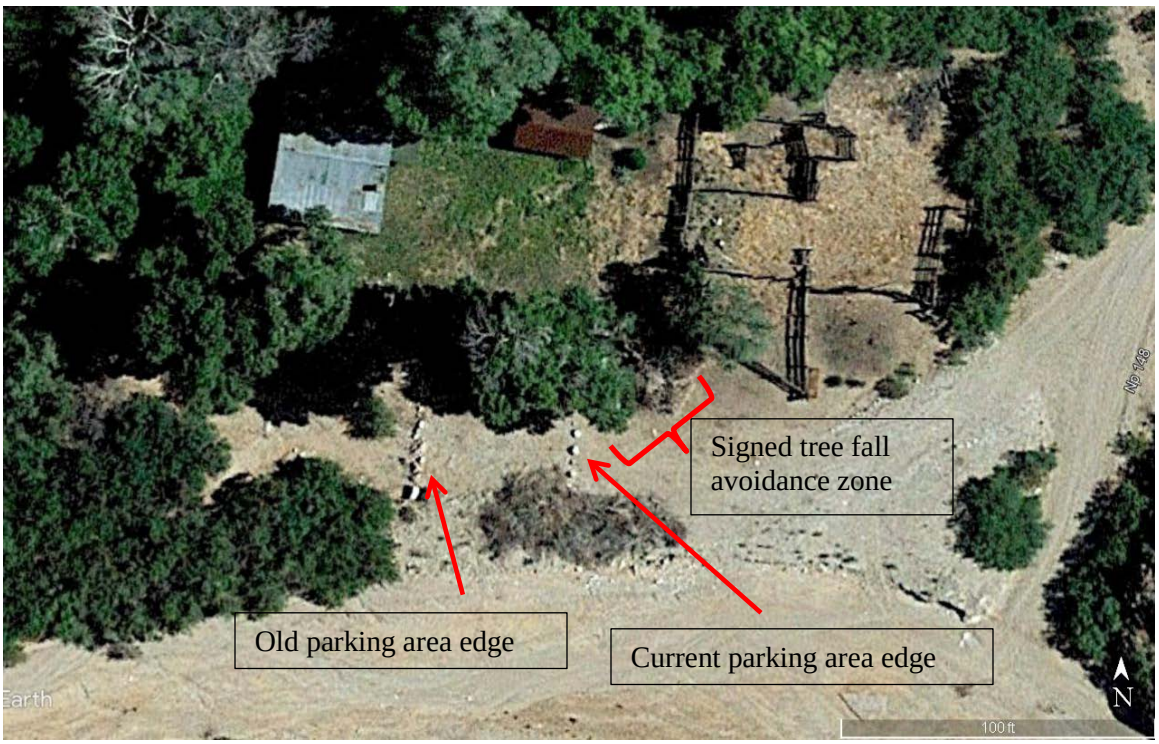


Figure F-1. Parking area configuration as of June 2018. Image courtesy of Google.

Starting in 2017, several of the large cottonwood trees nearest the parking area began to drop large branches. The parking was shifted away from the likely fall zones and the barrier rocks for the parking edge were shifted as well to minimize potential risks to visitors (Fig. F-1).

This decision was timely because, in early 2018, another large branch dropped off a cottonwood tree in the new parking area (Fig F-2). This branch fell on top of the hazardous trees sign. This pattern is continuing (Fig F-3) with two other trees in the cottonwood row losing major or all branches since early 2018. Until all the aging trees are replaced, the current parking area is anticipated to remain. After the trees have been dealt with, allowing horses to be tethered to hitching posts near the fence and vehicles parking nearer to the fence will be reconsidered.

Figure F-2. Early 2018 treefall into current parking area. Note human for scale.

Figure F-3. Mid 2018 treefall. Tree behind early 2018 incident has now lost all branches.

During 2014 flood, the parking area was raised by over a foot in places. This was determined by comparing the height of the trail register and adjacent wayside pre and post flood. As part of the ranch yard recontouring, the SMP would bring the parking area back to the pre-flood level. This can be determined by using the aforementioned known heights of the visitor use infrastructure (signs and trail register), the pre-flood pictures of the worm fence (Fig. F-4 and Fig. F-5) and the known location of the valve box for the French drain system in the old parking area.

Figure F-4. Pre-204 flood image of the parking area. Note the fence has 4 rails clearly above ground level.

Figure F-5. Post 2014 flood. Note the bottom rail is completely buried in sediment. The trail register, when opened, was full of fine silt.

Ranch Yard Modern Fence

The only point of departure regarding the CLR recommendations and the SMP is about gates. The CLR recommends gates for maintenance vehicles and is silent regarding gates specifically for visitor access. The SMP agrees with the maintenance gates, modifying them only to include an ability to lock all gates. Unfortunately, this area has known populations of feral cattle, feral horses and wild burros. It is very likely that a visitor may not properly close the gate, and some form of feral livestock or wild burro could enter the fenced ranch and cause damage to the historic structures and natural features. A human foot traffic only gate designed to exclude feral livestock and burros would greatly reduce that occurrence. This gate design would need to take into account the latest accessibility requirements, something a large swing gate would not do. The current visitor gate, a walk-through gate, does not meet accessibility standards and is also not burro-proof.

Additionally, many visitors reach Tassi Ranch after driving through the desert on OHVs. Even when signage is present, visitors may be tempted to drive their OHVs through the large gates and throughout the cultural landscape if there is no clear visitor access alternative and the large gates are not locked.

Fences (excluding Modern Fence and Corral)

The original fences built around the agricultural fields and partially around the ranch core were built to keep livestock either in or out depending on time of year and location. Fence were repaired, replaced and strengthened most likely as soon as the first section was built and continued to be modified by NPS in the early 2000s. This resulted in fences built with anywhere between 2 and 6 strands of barbed or smooth wire. It is unknown if the rancher considered wildlife safety when constructing the fence. However, the GMP/RMP (2008) directs the Monument

> 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.

At Tassi Ranch, the main species of concern regarding fence design is bighorn sheep. BLM and AGFD have devised specific fencing standards to meet the needs of bighorn sheep. The SMP proposes to maintain the historic fenceline as per the CLR, but the design would be altered when sections are replaced (too damaged to repair) or repaired to take into account the latest standards for wildlife friendly fencing. Considering the numerous modifications made to the fence design over the years, and thus the near impossibility of determining the strand arrangement during the period of significance, altering the number of strands and relative ratio of type of wire over time should not cause a visible change to the fence that would change the look and feel of the fenceline.

Ranch Yard and French Drain

Partially in response to the 2014 flooding and partially in response to modern activities in the ranch yard, the SMP deviates from the CLR by proposing to contour the ranch yard with a slight slope toward Pigeon Wash to the south and expand the French drain in the existing footprint before installing new, non-historic ditches. The 2014 flood associated sediment deposition did not stop at the fence line. The stock tank (part of the irrigation system) is completely buried (Fig. F-6) and the portion of the ranch yard just south and west and in front of the house accumulated a visible layer of sand (Fig F-7). To restore the previous look of the stock tank, the area would need to be lowered. It is more difficult to determine how far north into the ranch yard the flood extended near the barn because of the almost immediate surge in vegetation growth to the west of the house but, given the extensive sedimentation near the fenceline, several inches of sediment could have been deposited.

Figure F-6. Post 2014 flood. Location of buried stock tank.

Figure F-7. Post 2014 flood. Closest visible sediment deposition to ranch house.

The CLR recommends constructing a ditch behind the barn to direct flow away from spring box 1 and another ditch to drain water away from the shed. At this time, the ditch from spring box #1 is not necessary. Spring box repairs conducted up until 2014 and the existing French drain dried out the entire surrounding slope. Between the house and barn, an east-west hummock developed due to the now stopped seepage from spring box #1 (causing the ground to compact and silt to flow away from the toe of the hill), the scattering of soil from the installation of the French drain and the slow accumulation of vegetative debris. As of 2018, the floor of the barn is at least 4 inches below the current ground level directly in front of the barn. The barn appears to be sinking into the ground (which it is not) and next to it is a long low spot, both of which periodically appear damp or saturated. This is caused by the barn and low spot being the lowest points on that side of the house. Removing the overburden would allow the water to drain naturally to the wash and relatively raise the barn level. Cleaning out the French drain behind the barn should be enough to catch any temporary seepage if the spring box begins to leak again after 4 dry years.

Similarly between the house and shed, though without a hummock, soil from the installation of the French drain and an adjacent accumulation of vegetative matter has raised the ground level

and the shed is now on saturated ground year-round. In addition, at some time after 2013 but before 2017, a small spring noted in 2006 on the slope behind the shed increased its flow. This may be related to fault line activity (See *Scientific Monitoring)* or the ditch breach that began in 2013 (See *Irrigation System- Functioning Ditch or Springbrook)*. This saturated area most likely terminates below the current French drain and the flow is visibly following the path of the French drain to the wash. This French drain, like the one associated with spring box #1 may be sufficient to capture the flow if it is repaired. Since repairing it would most likely involve digging up the line to remove clogs from silt and tree roots, it would make sense to also bolster the configuration to capture more water before placing another non-historic ditch in the ranch yard that may not be necessary.

An additional consideration of placing ditches in the ranch yard is the likelihood of accidentally expanding riparian habitat. Adding open water to the desert invites new vegetative growth and attracts wildlife. While these are generally good things, this would be doing so within feet of historic structures. The vegetation would increase the possibility of fire carrying into the structures and the expanded habitat may complicate the protection of the cultural landscape by introducing special status species into previously unoccupied areas.

As such, while ditches may be necessary in the future, the SMP proposes instead to start with repairing and expanding the current infrastructure before installing more non-historic elements.

Ranch House

In this case, the SMP proposes to add material such as expanded metal to the entry points and windows of the ranch house. This would be placed behind the existing doors and screens and repaired screens to maintain the historic look and feel of the house. Since 2013, the bathhouse door has fallen off its hinges and several screens have been damaged, most likely by a burro that learned how to walk through the visitor gate in 2015 (Fig. F-8). Visitors do not regularly close the functioning doors to the house either, leaving the house open to wildlife. Such animals, if the doors are closed at a later time by wind or other visitors, could attempt egress by boring through the screens.

Figure F-8. Front of house showing some of the damaged screens (September 19, 2018)

A consideration to visitor safety must be made as well. Arizona had the third highest rates of disease contraction to hantavirus in the country as of 2017 (CDC 2018). One of the primary carriers, deer mouse (*Peromyscus maniculatus*), is listed as common and a breeder on the Monument. The interior of the ranch house provides an ideal location for deer mice to build nests where hantavirus can be stirred into the air by visitors entering the building. Preventing visitor entry into the building protects not only the building from inadvertent damage by visitors leaving the doors open, it protects visitors from potentially contracting a fatal disease.

Ranch Road

In response to the increased foot traffic to Tassi Ranch, the SMP proposes to place 2 temporary foot bridges over the breached section of the springbrook as it runs down the hill. The bridges would be removed once the new breach has been constructed. The lower foot bridge would be in the old main ranch road while the upper would be where a spur of the ranch road parallels the original ditch. These bridges would help slow the gradual widening of the springbrook at these 2 locations. While this may seem minor, the gradual widening and shallowing of the breach flow at the lower location threatens to allow the water to flow not directly downhill into the wash but

turn nearly ninety degrees and flow directly down the main ranch road and toward the historic buildings. This would also increase the likelihood the wash would dewater and the endemic population of speckled dace would be extirpated. As has been seen before at Tassi, adding water to the area near the buildings results in a vast overgrowth of vegetation that reduces the fire defensible space around the historic structures. Visitor safety is another concern. As the breach section has widened at these two locations, the ability to step over the water has been severely curtailed. Both locations require stepping on partially submerged loose small algae covered rocks while avoiding nearby thorny vegetation to traverse the water.

Irrigation System- Functioning Ditch or Springbrook

The SMP and the CLR agree on the extension of the functioning ditch to a new breach and the timing of the work, however, there are several natural resources-related issues that modified the SMP proposed actions from the CLR recommendations.

A brief history centered on the springbrook since January 2013

The shallowest section of the springbrook is at the base of an approximately 15-20% slope of unconsolidated alluvial gravel. From EA 3.4.3 "the dominate soil type is a 75% mix of Oxyaquic Torriorthents and 20% Typic Endoaquents. These are entisols which exhibit very little soil development other than a top layer soil horizon". This soil has very little stability once the silts have blown or washed away. The slope above the ditch is essentially constantly sliding into the springbrook. In late 2013, a section of the springbrook breached due to this shallowing. Emergency attempts were made to rebuild the berm using the excavated materials from the shallow section but the lack of soils and other fine particulates made this berm too permeable to be of use. In fall 2013, the resulting overflow area was cleared of vegetation (primarily *Typha* or cattail) and the *Typha* leaves and stems were bound together to create a temporary berm along the breach. One section of the breach that included a large willow in the bank continued to flow slowly. Using piled leaves dropped over several years from the nearby cottonwood tree, the remaining flow was diverted away from the buildings. In 2014 and again in 2015 the site was visited by the Mojave Desert Inventory and Monitoring Network (MOJN) Hydrologist in part to consult about the remaining flow. During the 2015 visit, it was determined that the main breach flow was now under a partially dead willow, following the cavities in the soil left behind by decaying roots. Using a mixture of rocks and soils devised by the hydrologist, the breach was temporarily slowed under the willow in 2016 but it was determined that the removal of the willow was the only way to stabilize the springbrook. Also in 2016, a springhead that previously was only a slow seep suddenly greatly increased its flow, causing the upper slope to slump into the springbrook. The new flow intersected the springbrook within 4 feet upstream of the willow, narrowed the ditch and washed out the berm. This new breach was again temporarily repaired; however it was now continuous with the breach under the willow tree. In early 2017, to avoid active bird nesting season, the non-historic willow was removed and the enlarged breach repaired.

After the new higher flow was detected, questions arose about a potential connection to the increased flows behind the shed (See *Scientific Monitoring).*

Recontouring

Based on the lessons learned from these incidents and discussions with both the MOJN hydrologist and the PARA physical scientist (geologist), a long-term solution to the shallowing of the ditch would be to add a retaining wall to the uphill side of the ditch in the sections with steeper slopes. At the current ditch depths, the wall could be as little as a foot in total depth (about 2/3 buried) and could be constructed out of concrete, rock, wood or a combination of these materials. As an example, the visible sections of the retaining wall would be primarily wood or stone but the hidden sections may incorporate concrete or landscape fabric. If the ditch were excavated without this wall, it is likely the ditch would almost immediately fill in again with gravels from upslope. Given the soils in the steep slope sections, the berms recommended in the CLR, built of excavated materials, would primarily be cosmetic and would at best slow seepage. The retaining wall would also help minimize new breaches cause by a sudden high flow from the uphill springhead by dissipating the force of the flow and keeping the new slump of the uphill gravels out of the springbrook.

Recontouring the ditch in thirds would result in habitat disruption to the lower third(s) of the ditch. Recontouring the springbrook to meet the recommendations, especially as it will involve salvage operations for RLF and springsnail, would be best done at one time. Small scale recontouring to maintain the new configuration would still be done in stages and should not result in the same extremes in silt loading and flow variability as the large scale recontouring.

New breach

Due to the presence of *Rhinichthys osculus* (speckled dace) in the wash, dependent on the springbrook for the only source of water, water from the new breach cannot be dispersed south of the ranch core fence. *Rhinichthys* is also found in the springbrook and may have been washed into Pigeon Wash after the initial breach in the ditch. Instead the SMP proposes to contour to direct the main flow of water from the new breach directly into the wash.

Vegetation

The planned vegetation treatments in and adjacent to the springbrook are modified in the SMP to account for habitat requirements of the relict leopard frog (*Lithobates onca,* RLF) and the Grand Wash springsnail (*Pyrgulopsis bacchus*). RLF is managed under an interagency Conservation Agreement in lieu of listing as a threatened or endangered species under the Endangered Species Act and the springsnail (along with several other springsnails found in the Mojave Desert) will shortly be managed similarly. Part of this sort of agreement is a commitment to maintain current habitat where it has been identified.

Tassi Spring, in 2006, became an introduction site for RLF. RLF historical habitat includes cold pools that are 30-40 cm (12-16 in) deep and vegetation that is a mix of submerged, emergent and

perimeter (LCRMCP 2016). Current known habitat requirements include variable density and type of vegetation, both shallow and deep water and both light and dark colored substrates (CAS 2005).

The springsnail is known from 3 springs in the area; Tassi Spring is the only location under federal jurisdiction. *Pyrgulopsis* is an obligate aquatic species; it cannot survive out of water. Studies at Tassi Spring found the springsnail avoids very shallow areas (less than 4 cm or 1.5 in), congregates in 4-10 cm (1.5-4 in) of water, and shuns flow rates greater than 30 cm/sec (12 in/sec). It prefers lightly shaded water and avoids both dense shade and bright sunlight. None were found in areas with less than 100% shade, thought this can include shade from aquatic, not riparian, vegetation. Springsnails were found preferentially in habitats with watercress and roots (primarily *Salix*). Preferred temperature is 24.2 to 24.8 ºC (75.56-76.64 ºF) (Sada 2005). Current water temperatures at the spring source measured in fall, winter and spring (2012-2016) vary from 24.3 to 25.01 ºC (75.74-77.02 ºF) (Bailard 2017).

The CLR recommendation would theoretically result in an open ditch with all vegetation on the uphill slope. The ditch would vary in temperature widely throughout the year due to the long open southern exposure after removing all vegetation on the downslope side and require near constant maintenance to keep *Typha* and *Pluchea* (arrowweed) from colonizing the full sun sections of the bank and watercourse. This became evident after approximately 5 small willows from along the bank were removed in 2009 and *Typha,* previously confined to approximately 10 meters (33 feet) of the springbrook, and *Pluchea,* primarily found on the upslope of the springbrook near springheads, overgrew an additional 30 meters (98 feet) of the springbrook within 18 months.

The SMP modifications include clearing vegetation from 33% of the ditch per year, not dividing the ditch in thirds. This would maintain the extremely variable habitat currently available and avoid extirpating one habitat type at a time (i.e. remove all of the light shade areas which are generally found 10 m from the spring source). This would also minimize fluctuations in temperature and cover availability. Upslope vegetation (primarily *Prosopis* and *Acacia*, with some *Pluchea*) could be cleared at any time, but would need to be cleared very carefully to avoid causing the slope to slide further into the springbrook. While attempts would be made to establish vegetation on the north side (upslope) of the springbrook, the requirement that the upslope woody vegetation would be partially cleared to 5 feet from the ditch on a rotating cycle makes this difficult. Vegetation on the upslope that is not at least partially in the ditch or wetted areas took several years to develop and tends to not shade the springbrook. To maintain enough habitat diversity and area for both RLF and *Pyrgulopsis* while providing at least some of the historic character of the ditch may require another cottonwood tree to establish in the old road. The one tree that did this successfully has created headwaters with almost no downslope shrub vegetation and a small section of *Salix*.

As an aside, the considerations that resulted in the SMP modifications for the current functioning ditch would need to be extended to the newly rewetted sections, though the slope is much lower, colonization by RLF and *Pyrgulopsis* is likely.

Ranch Fields

The CLR recommends removing the exclosure in the agricultural fields to reduce invasive species and its effect on the historic character of the fields. The SMP proposes to remove the exclosure upon direction from the Lake Mead National Recreation Area (LAKE) specialist group that placed the exclosure. When queried in 2013, because the exclosure fence is intact, LAKE requested the exclosure remain as it is the only long term monitoring plot they have in the Mojave portion of LAKE that is now Parashant. A second query in 2018 resulted in a continued request to keep the exclosure by LAKE and a further interest in using the existing monitoring site by MOJN. The fields and exclosure, when casually surveyed in 2017, did not show a marked difference in the presence of invasive species between the two locations, rather the entire agricultural fields were clearly delineated by a solid mat of desiccated *Schismus* (an invasive grass).

Scientific Monitoring

The CLR, while recommending extensive monitoring of historic structures, vegetation that may impinge on structures and modifications made to the surrounding landscape, does not address scientific monitoring at the site. Tassi Springs is one of the two large springs on Parashant National Monument and is believed to be an important watering location for wildlife and habitat for riparian associated species. Non- or minimally invasive monitoring of natural resources already occurs at the site. Under the Conservation Agreement, RLF and other amphibians are monitored at least annually for population status. Benthic macroinvertebrates, including *Pyrgulopsis*, and water quality are monitored by MOJN. The SMP proposes adding installations to the site to monitor a wider suite of natural resources, some of which may inform actions taken to protect historic structures and other elements of the cultural landscape. The monitoring station would provide a range of environmental measurements and help us understand the local microclimate and the wildlife interacting with the springs. The weir/flume would allow us to collect information about water flow and create a stable location for fully reproducible water quality results. The monitoring wells would be placed to help capture information related to the subsurface spring activity.

Tassi Ranch is in the Wheeler fault zone and nearly directly on the Wheeler Fault which is capable of up to 5.5 magnitude earthquakes. Tassi Springs exhibit characteristics suggesting they are at least partially controlled by the fault. The PARA physical scientist, who has casually surveyed around Tassi Springs and the nearby landscape, has noted travertine deposits in Pigeon Wash and also upslope both east and west of Tassi Springs, all locations where springheads once occurred. The type of faulting in the area and the travertine deposits suggest that the springs can migrate drastically in location and over a relatively short period of time. The sudden increase of

flow that led to the ditch breach may be related to fault activity. There is also some suggestion that the new flow and the increased flow behind the shed are linked, both on the same crack in the fault.

In 2006, a small seep was noted by NPS spring survey personnel behind the shed. This seep, from the images, appears to be perennial. In 2016, a large sunken area was noted on the slope, approximately where the old springhead was found. After clearing the area, the seep was clearly visible. Currently this seep appears to be gaining flow (Fig. F-9 through 11).

Figure F-9. June 15, 2006. Tassi Spring B source directly behind shed. Note presence of *Typha*.

Figure F-10. Tassi B spring February 21, 2017. Note presence of *Typha* and cottonwood tree behind shed

Figure F-11. Tassi May 22, 2018. Note cottonwood tree appears dead, likely caused by roots now in saturated soil. Also note *Anemopsis* (yerba mansa) growth as the entire area to the west of the house is now either wetted or has flowing water.

This is only one example of why monitoring wells would be of use at Tassi Ranch. The shifts in springflow and the water table may result in injury to the cultural landscape as well as the natural landscape, monitoring may help us prepare for or predict these events.

Table F-1. Overview of differences between SMP and CLR with justification and short description of nexus with Secretary's standards.

Location	CLR	Departure	Brief Justification	Secretary of the Interior's Standards Discussion
Parking Area	Encourage visitor parking near corral. Install hitching posts	Short term: smaller parking area and no hitching posts	Hazardous trees drop limbs onto area for parking and hitching posts	N/A. Restricting access to a portion of a site for safety reasons should not interfere with the preservation of the cultural landscape.
Parking Area	NA	Lower height of parking area	Flood debris raised level of parking over a foot in areas since CLR	This action falls under Preservation – repair historic features. This would uncover the feature that was buried.
Ranch Yard Modern Fence	NA	Add visitor walk through gate	Allow visitor access to site. Comply with accessibility requirement	This is not a historic feature. There is currently a walk through gate of a different design that is not compliant with current accessibility standards.
Ranch Yard Modern Fence	NA	Lock maintenance access gates	Keep gates from being left open by visitors and minimize unauthorized vehicle access to cultural landscape	This is not a historic feature. This is a minor modification to the CLR recommendation to better protect the site.
Fences (Excluding Modern Fence and Corral)	Repair ranch perimeter fence by…re-stranding and tightening 3-strand wire. Repair historic fence on the east side and north side of the fields…use juniper and/or	Repair fence whenever possible with exact in-kind (i.e. if wood post is damaged, replace with wood, if metal post is damaged, replace with wood). Restrand following BLM	Current fence is mix of wood and metal posts. In-kind replacement for east/north perimeter fence is consistent with all other sections of core/perimeter fence. Historic fence is currently a mix of number of strands (2-6) and mix of smooth and barbed wire. To avoid injury to wildlife, as sections are repaired, must follow required strand arrangements.	"Repairing includes the limited replacement in-kind of extensively deteriorated materials or parts of features." (NPS 1996) The wire strands being replaced can no longer to restrung as they are too brittle to be properly stretched. The historic strand arrangement cannot be determined after the many different repairs to the fence and many different site occupants.

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	mesquite for fence posts…use barbed wire stringers	and AFGD handbook/guidelines for wildlife friendly fences		Character defining features and materials (the fence itself and the posts and wires) are preserved. From a cultural resource standpoint, wildlife friendly strand arrangements also result in less damage to the fenceline, better protecting the integrity of the historic fence by reducing the amount of the fence that would need to be repaired (replaced with new materials).
Ranch Yard	Repair French drains as backup to new surface ditch system	Repair French drain and expand in same footprint French drain before adding new surface ditches	French drain repair/cleaning would most likely require digging up the system; augmenting the water capture capabilities at the same time would result in less ground disturbance, avoid adding another visible non-historic element to ranch yard unless absolutely necessary and avoid introducing another area of rapid vegetation growth next to historic structures. Behind barn ditch unnecessary at this this as spring box #1 is no longer leaking.	Neither the French drain nor the proposed ditches are historic features; rather they help protect the 2 historic structures in the ranch yard.
Ranch Yard	NA	Recontour yard level back to level pre-NPS modifications	Flood and vegetation debris and raised soil from NPS projects raised level of yard, buried the historic stock tank, and caused low spots to capture water from rain events and subsurface spring flow	This action falls under Preservation – repair historic features. This would uncover the feature that was buried.

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Spring Box #1	Clean/repair spring box	Inspect/repair only	Repair completed since 2013	This is Preservation-maintain historic features and materials. The first step, repair, has already been completed.
Ranch House	NA	Add expanded metal sheets behind screen and doors	Restrict visitor (minimize potential health hazards) and wildlife ingress into building (damage to structure from nesting and other activities)	Two guidelines apply – installing safety-related systems that result in the retention of character-defining features and protecting historic features. The screens would help prevent human visitors from encountering an area where the chance for contracting a disease is higher while also protecting the integrity of the building from inadvertent human damage and wildlife. The screens are easily removed if necessary and do not require alterations to the ranch house.
Ranch Road	NA	Place short-term footbridges over 2 locations where visitors cross breachflow from functioning ditch	Visitor safety (keep visitors from falling in water crossing) and prevent breachflow from shifting toward historic structures	Features within a cultural landscape may need to be stabilized or protected through preliminary measures until additional work can be undertaken. In this case, protect the ranch road from further erosion and prevent water from following toward historic structures until breach can be relocated.
Functioning Ditch or Springbrook	NA	Stabilize ditch with upslope low retaining wall or edging	Maintaining flow without repeated breaches will require recontouring at least every 3 years. Ditch quickly fills in with material from unstable slope. Shifts in spring heads cause unexpected ditch	Portions of a historical structural system could be reinforced using contemporary materials. Specifically for water features, repairing with reinforcing material.

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			breaches.	Retaining wall will help stabilize the ditch and repair the upslope wall of the ditch, and springflow pattern and help prevent breaches that flow toward other structures
Functioning Ditch or Springbrook	Phase work to re-contour one-third of the ditch	Major recontouring of entire functioning ditch at same time. Small scale recontouring would be in thirds	High frequency removal of built-up materials in ditch is detrimental to Grand Wash springsnail and relict leopard frog. Salvage operations would need to be conducted each time. Recontouring any upstream portion will result in disturbance to all downstream sections. Single large scale recontouring would minimize amount of time the aquatic ecosystem is disturbed.	The work in the ditch falls under Preservation and Rehabilitation – environmental considerations. The functioning ditch is closest to a "reclaiming" state. Modification of the CLR promotes the highest degree of environmental protection while maintaining the original ditch function. Single short-term large scale disturbances would be preferable to phased disturbances that would actually disturb at least two-thirds of the system in two consecutive years and would help repair the historic attributes of the functioning ditch faster.
Functioning Ditch or Springbrook	Only work on one-third of functioning ditch per year in order to maintain aquatic habitat.	Work on 33% of ditch area per year.	RLF rely on different habitat at different lifestages. Grand Wash springsnail optimal habitat is found in only one section of the ditch that would be removed entirely during 1 year of the vegetation maintenance cycle. Existing RLF Conservation Agreement (CA) and future springsnail CA require preservation of suitable habitat.	The work in the ditch falls under Preservation and Rehabilitation – environmental considerations. The functioning ditch is closest to a "reclaiming" state. Modification of the CLR promotes the highest degree of environmental protection while maintaining the original ditch function. While the ditch would not look exactly

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				as it did within a narrow window after vegetation removal during the period of significance, the ditch will continue to flow its original path, with no deliberate change in channel depth or width from what is believed to be the historic condition. Shifting to 33% instead of one-third maintains more habitat possibilities for the RLF and springsnail and softens the visual change over time to a less heavily vegetated version of the ditch.
Functioning Ditch or Springbrook	Annually flush cut all herbaceous and woody vegetation growing in the functioning ditch and ditch wall, and to 5 feet up the ditch back slope using a weed hog trimmer blade or brush blade.	Cut only 33% of the area, retaining woody vegetation as necessary to provide shaded ditch and as springsnail habitat	Completely exposed sections of ditch will fill in with dense Typha and Pluchea. Water temperature needs to be relatively constant for springsnail. Springsnail prefers Salix roots for habitat. RLF will need cover from predators. Existing RLF Conservation Agreement (CA) and future springsnail CA require preservation of suitable habitat.	The work in the ditch falls under Preservation and Rehabilitation – environmental considerations. The functioning ditch is closest to a "reclaiming" state. Modification of the CLR promotes the highest degree of environmental protection while maintaining the original ditch function. While the ditch would not look exactly as it did within a few weeks of when it would have been cleaned during the period of significance, the ditch will continue to flow its original path, with no deliberate change in channel depth or width from what is believed to be the historic condition.
Functioning	Establish trees or	May need to	No trees or shrubs would be allowed	The work in the ditch falls under

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Ditch or Springbrook	shrubs on the north side of the…ditch to provide shade	retain some trees or shrubs on south side to provide shade	within 5 feet of the ditch per CLR. No trees or shrubs on the north side of the ditch that have stems at least 5 feet from the ditch currently provide any shade to the ditch. Will be extremely difficult to establish trees/shrubs in dry unconsolidated gravels with minimal soil.	Preservation and Rehabilitation – environmental considerations. The functioning ditch is closest to a "reclaiming" state. Modification of the CLR promotes the highest degree of environmental protection while maintaining the original ditch function. Shade is a requirement for Grand Wash springsnail. Attempts to create a shade on only the north side may not successful.
Functioning Ditch or Springbrook - New Breach	Contour alignment of the breach channel to create a gentle slope before the point of release to disperse the out-flow south of the core protection fence	Contour new breach channel to ensure road is not eroded and maintain high enough flow to Pigeon Wash	Pigeon Wash portion of springbrook supports native fish population reliant on Tassi Springs for water	The new breach is within the cultural landscape but the area where the water would be dispersed is not. Changing the flow pattern in a new area should not impact the cultural landscape features in any way different from the CLR recommendation.
Ranch Fields	Remove exclosure fence from long-term monitoring plot	Remove exclosure fence from long-term monitoring plot if Lake Mead NRA specialists are no longer monitoring vegetation.	Lake Mead NRA has requested the monitoring plot remain in place until a monitoring plan can be established. The exclosure is not a source of encroaching vegetation; it is currently casually distinguishable from the rest of the agricultural fields only by the fence around it.	According to the guidelines, the fenced area should be removed because it intrudes on the historic spatial organization of the cultural landscape. However, the exclosure is a nearly visually invisible component of the area and has been in place since the 1993 and is a rare example of a long-term

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				exclosure. MOJN has expressed interest in incorporating it into their long-term monitoring of the spring.
Scientific Monitoring	NA	Install monitoring station, wells, flume	All three types of monitoring would inform on the springflow patterns and microclimate of the cultural landscape as well as monitoring for wildlife at the cultural landscape. Data would also be used to detect potential threats to historic structures.	The character-defining features would not be noticeably changed by the addition of wells and monitoring station because they would not be in close proximity to any feature except the functioning ditch and the agricultural fields portions of the cultural landscape. All efforts would be made to reduce the visibility of the station, including non-reflective surfaces and camouflage-type paint on instrument surfaces. The specific locations would incorporate visual resource management considerations so that topography and vegetation would screen the equipment as much as possible. Including the flume, the monitoring devices are the minimum size and location necessary to monitoring the site and providing information that could aid the protection and maintenance of the cultural landscape.

References

Bailard JL and Moret GJ. 2017. Mojave Desert Network selected large springs: Tassi Spring benthic macroinvertebrate and springsnail data 2012 to 2016. Natural Resource Data Series. NPS/MOJN/NRDS—2017/1119. National Park Service. Fort Collins, Colorado.

Centers for Disease Control and Prevention (CDC). Hantavirus Disease, by State of Exposure. https://www.cdc.gov/hantavirus/surveillance/state-of-exposure.html. Accessed August 27, 2018.

Lower Colorado River Multi-Species Conservation Program Bureau of Reclamation (LCRMCP). 2016. Species Accounts for the Lower Colorado River Multi-Species Conservation Program. https://www.lcrmscp.gov/reports/2013/c3_species_accounts_2013.pdf#relict. Accessed 8/28/2018.

Sada DW. 2005. Abundance, distribution, and habitat use of the Grand Wash springsnail (*Pyrgulopsis bacchus*), Grand Canyon-Parashant National Monument, Arizona. Desert Research Institute. Reno, Nevada.

[Conservation Team] Relict Leopard Frog Conservation Team. 2005. Conservation agreement and rangewide conservation assessment and strategy for the relict leopard frog (*Rana onca*). Unpublished document, available at: http://www.fws.gov/nevada/es/documents/esa/Rana%20onca%20CAS%20Final.pdf