Tassi Ranch
Cultural Landscape Report | Historic Structures Report
Grand Canyon - Parashant National Monument



National Park Service
Pacific West Region
Cultural Resources Program
2013

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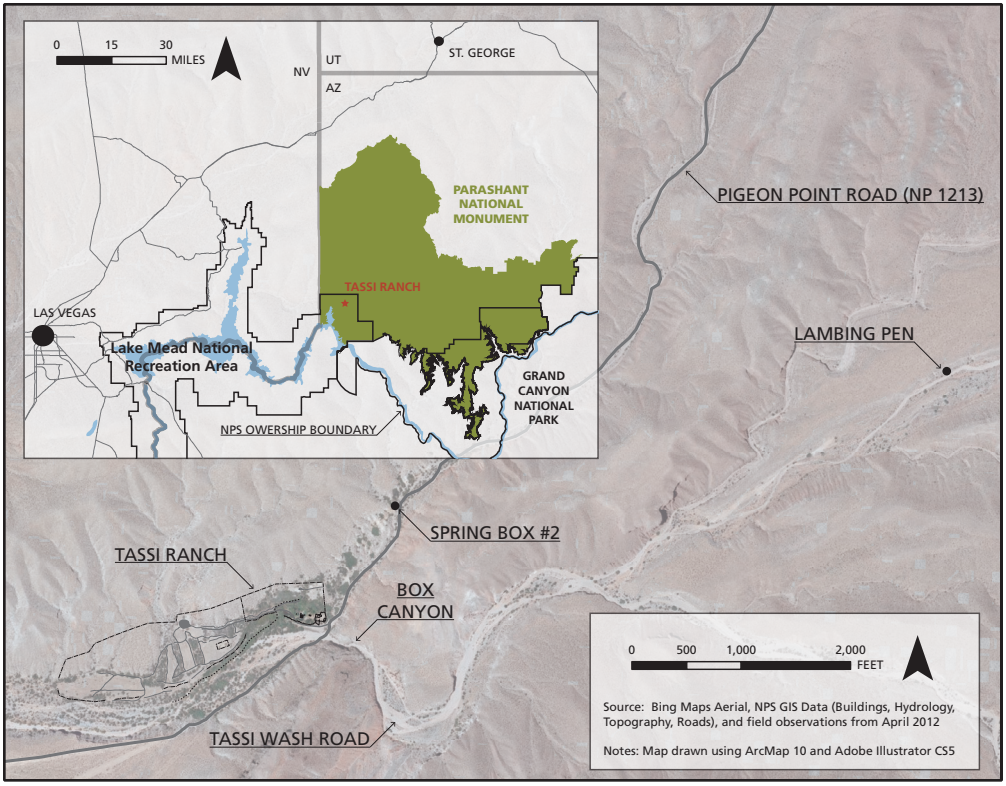


Figure 1. Location map and site boundary for the resources addressed in the Tassi Ranch Cultural Landscape Report and Historic Structures Report.

Introduction

Tassi Ranch is located in Grand Canyon-Parashant National Monument (Parashant) and is comprised of approximately 31 acres in an area known as the Arizona Strip, which encompasses the lands north of the Grand Canyon and south of the state of Utah. The landscape is vast and remote with deep draws and steep canyons that rise hundreds of feet to flatlands that extend for miles. The core of Tassi Ranch is clustered around Tassi Springs—a system of seeps and spring heads at the center of the property. Here, a small cluster of buildings, corrals, pasture areas, irrigation ditches, and other features remain from a twentieth century ranching operation. The period of significance for Tassi Ranch extends from 1936 to 1947, and encompasses the years when Ed Yates, a local rancher, first gained an Arizona Certificate of Water Rights for Tassi Springs and extends to the year he sold the property to Eldon Smith. During this time, Yates improved the springs, planted crops and shade trees, constructed the ranch house, reservoir, corrals, and an irrigation system which extended some distance from the springs to water the ranch fields.

Tassi Ranch is 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. The construction of the ranch house is unique in that it is built of rock, which distinguishes it from many of the ranch houses built in the early twentieth century on the Arizona Strip, which are typically constructed of logs. The small, two-room barn is also unusual in that it is constructed of railroad ties with lapped ends. Overall, the extant features at Tassi Ranch and springs represent a unique ranch district in which the individual components of the ranch display local adaptations to the needs of living on and running a ranch in the remote desert environment.

Purpose and Methodology

Between 1936 and 1981 Tassi Ranch was managed to support ranching operations. After the last grazing permit expired in 1996, the site was largely abandoned and little maintenance occurred. As a result, and over the years, the physical

character of the ranch began to change as evidenced by the rapid expansion and encroachment of invasive vegetation, degradation of irrigation structures, erosion of landforms from flood events, and a general deterioration of ranch structures and outbuildings from exposure or structural failure. Collectively, these impacts had the potential to adversely affect resources, visitor safety, and the overall integrity of the historic ranch.

To better understand resource and management issues at Tassi Ranch, the park completed a number of baseline inventories. Key among these was the Cultural Landscapes Inventory: Tassi Ranch, 2003(CLI) and the documentation of archaeological resources completed by the Arizona State Museum (1999). Tassi Ranch was also documented by the Historic American Landscape Survey in 2010 (HALS). In 2006, the park conducted an interdisciplinary workshop with park staff, the Bureau of Land Management, resource specialists, and park partners to identify management issues and develop interim strategies for stabilization of natural and cultural resources, enhancing visitor safety, and interpretation of the historic ranch. Findings from workshop were consolidated in a new report: the *Tassi Ranch and Springs Interim Treatment Plan*, 2007 (Interim Treatment Plan).

Figure 2. Interdisciplinary workshop with partners responsible for management of Tassi Ranch participating in the development of the Interim Treatment Plan. (NPS, 2006)



This Cultural Landscape Report/Historic Structures Report (CLR/HSR) draws from existing baseline information and builds on the guidance provided in the Interim Treatment Plan to provide recommendations for preservation of historic structures and cultural landscape resources at Tassi Ranch. Because information in the CLR/HSR is excerpted from the baseline inventories and other studies, limited time was spent conducting additional research for this report. However, several site visits to Tassi Ranch were made by the project staff to update current conditions, identify assets for the maintained landscape, and collect information about current maintenance regimes and recurring tasks for FMSS. These site visits with park staff became the foundation for development of prescriptive recommendations made in this CLR/HSR and were critical for understanding the relationship between natural systems, cultural resources, visitor use, and the level of maintenance required to build a sustainable preservation maintenance program.

Figure 3. Close interaction with park staff was a key component for the development of realistic preservation treatments (NPS, 2013)





Figure 4. The remote location and vernacular character of Tassi Ranch were both important factors influencing viable strategies for preservation maintenance. (NPS, 2013)

Management Goals and Format

The General Management Plan/Environmental Impact Statement, Grand-Canyon Parashant National Monument, 2008 (GMP) states that Tassi Ranch will continue to be managed as a public use site, with the following implementation actions:

- *The historic irrigation system will be maintained to allow for conservation of Grand Wash Spring snail, an endemic species.*
- *Historic Landscapes will be managed to maintain historic and ecological integrity*
- *The Tassi Ranch cultural landscape will be nominated for listing in the National Register of Historic Places (NRHP)*
- *A cultural resource cyclic maintenance program will continue*

GMP/EIS ROD, Page 4, 2008

Within this framework, a fundamental management goal for the treatment of resources at Tassi Ranch is to assure an integrated approach to the preservation of historic structures and cultural landscape resources based on sustainable maintenance and the integrity of natural systems. A key strategy for attaining this goal is advocating a strong and open collaboration between resource managers and maintenance crews responsible for stewardship at Tassi Ranch, and through this collaboration, enhancing operational efficiencies and viable approaches to long-term stabilization and preservation.

With the emphasis on maintenance, this CLR/HSR is formatted as a handbook in two parts. Part 1 provides a historical overview of physical development at Tassi Ranch, a summary of existing conditions, a brief description of cultural landscape characteristics, and summary table of significant resources. Virtually all of this information is excerpted or summarized from the CLI, the HALS report, and field documentation conducted between 2010 and 2013. Part 2 includes an introduction to treatment—describing the treatment philosophy and primary treatments; the recommendations for historic structures and cultural landscape resources; and a table outlining deferred and recurring maintenance for assets in FMSS. All recommendations are organized into management zones based on historic use and function, current preservation issues, and the level of maintenance required to achieve management goals.

Study Boundaries

The boundary of the Tassi Ranch cultural landscape encompasses 31 acres of developments in the south central portion of S13, T33N, R16W in Mohave County, AZ. With the exception of one structure (lambing pen) the boundary includes all contributing resources associated with the proposed historic district during the period of significance, which includes major developments between 1936 and 1947. The cultural landscape boundary does not include vast tracts of desert lands grazed by livestock during the historic period, as the full extent of these holdings could not be identified in the historic record and the physical evidence of outlying ranch features is minimal at best. The study boundary coincides with the boundary for the Maintained Landscape in FMSS.

Historical Overview

Located in proximity to a system of naturally occurring springs, the area around Tassi Ranch has historically been an important oasis in the desert. Archaeological evidence suggests that the area was seasonally occupied for several thousand years and used by prehistoric peoples as early as 5,000 BP. Artifacts found at the ranch indicate that Ancestral Puebloan and Southern Paiute peoples used the area around the springs (Blalack et al 2004). In the late 1800s, the Pearce Ferry Road passed by Tassi Springs and at least two groups using the road mention encountering Native Americans at the springs (Belshaw and Peplow 1980).

The Reclamation Act of 1902 authorized the construction of Boulder Dam and withdrew large tracts of land from public sale, including the area around Tassi Springs (32 Stat., 388). Although these lands were designated federal and withdrawn, within a year new land claims and a series of illicit claims for water rights were made throughout the area. Most of the land was used for grazing livestock including sheep, cattle, goats, and horses. (Belshaw and Peplow 1980) The first known use of the Tassi Springs area for cattle was in 1912 when Sam Gentry used the springs as a base for his cattle operation.

In the 1930s, the area around Tassi Springs was developed as a cattle ranch by local rancher Ed Yates. The core of the ranch operation was located near the spring heads and extended west along the slope above Pigeon Wash, with open range lands extending north. Yates eventually built his house and support buildings down slope of the springs and constructed an extensive irrigation and ditch system to carry water from the springs west, to ranch fields. Water flowed to the fields through earthen ditches to a holding pond or reservoir. From there, a system of lateral ditches distributed water to three large fields sloping down to Pigeon Wash. Considerable time appears to have been devoted to maintaining this irrigation system, which was marginally successful in keeping the area around the buildings dry, and the fields irrigated. Ed Yates eventually sold Tassi Ranch and the springs to Eldon Smith in 1947 who later defaulted and the land was re-occupied by Yates. Finally, in 1973 Yates sold the property to Jim and Dennis Whitmore. (Belshaw and Peplow 1980:113-114)

Figure 5. Photograph of Ed Yates at Tassi Ranch, ca. 1963. Photo excerpted from magazine (Lake Mead Collections)

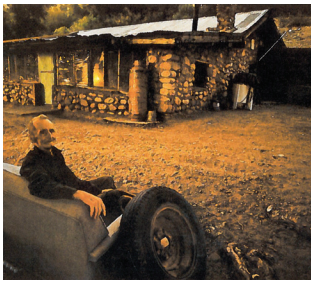




Figure 6. Historic view showing the east elevation of the Ranch House before the bathroom addition was constructed. View looking west, ca. 1947.(Lake Mead Collections).



Figure 7. Jim Whitmore in front of the ranch house during a site visit with NPS staff to assess historic resources. (NPS, 2013)

Jim Whitmore lived on the property and maintained the buildings, corrals, irrigation system, and ranch fields established by Yates. Whitmore added another holding pond above the springs. He used a backhoe to clean and repair the ditches, often burning the thick stands of arrow weed and mesquite above the channel to keep the ditches clear. In 1981 the National Park Service asserted federal ownership over Tassi Ranch through a Consent Judgment issued by the U.S. District Court for the District of Arizona, enjoining the Whitmores from residing in or using any structures on the Tassi property.(Hoover 1999:2) The NPS allowed grazing to continue on the property through a special use permit. Once the special use permit for grazing expired in 1996, Whitmore stopped maintaining the irrigation ditches and eventually, a breach occurred, leaving the fields and holding pond to the west, dry. In 2001, the Tassi Allotment, under which the Whitmores maintained use of the springs and rangeland, was administratively closed in accordance with the Desert Tortoise Recovery Plan and use of the ranch ended. With the removal of cattle grazing, and basic operations, woody vegetation began to encroach in the historically open areas of the ranch, especially the fields.

Today, the National Park Service (NPS) and the Bureau of Land Management (BLM) cooperatively manage Grand Canyon-Parashant National Monument. Under NPS management, staff from Parashant National Monument routinely clear vegetation around the developed areas of the ranch, maintain and repair the buildings and drainage

structures, repair fences, and generally maintain a safe environment for park visitors. Brush and leaf litter are also removed to reduce fuel loads and fire danger. When the existing pole rail fence failed, protection rangers constructed a split rail fence in front of the property to keep the feral cattle and burros from entering the ranch yard and damaging the structures. In 1999, the National Park Service historic preservation crews and maintenance staff conducted work to stabilized spring box 1 and the ranch house. That same year a French drain was installed to collect and divert spring water away from the ranch house and barn which were seasonally wet around the foundation and interior. The outflow for the French drain was located in Pigeon Wash, where today, it has contributed to a significant expansion of the mesquite thicket in the area. Endemic spring snails live in the functioning portion of the irrigation ditch, and the mesquite thicket at the outflow provides important habitat for important bird species including phainopepla (*Phainopepla nitens*), Lucy's warbler, and Bell's vireo.

Tassi Ranch continues to convey the characteristics that historically comprised the site during the period of significance. The springs remain the primary organizational element of the ranch. The row of cottonwoods, established during the period of significance, spatially defines the cluster of ranch buildings including the main ranch house, the barn, and shed. Irrigation ditches from the spring to the ranch fields, the holding ponds and spring boxes, the fences and corrals collectively reflect historic land use patterns and remain important landscape features remaining from the period of significance.



Figure 8. East elevation of the Ranch House today with the bathroom addition. (NPS, 2013)

Figure 9. (Following page) The ranch core at Tassi Ranch with Pigeon Wash in the foreground. View looking northeast, ca. 1947. (Lake Mead Collections)



Part 1:
Historic Character



Figure 10. The landscape character and setting for Tassi Ranch in the Arizona Strip. Photograph showing the historic fields (middle ground) and the ranch core in the distance near Tassi Springs. View looking east. (PWR, 2012)

Environmental Setting

Tassi Ranch is situated in a geologic transition zone between the Basin and Range Province and the Colorado Plateau. The ranch sits about three miles upstream from Lake Mead on the north bank of Pigeon Wash, a seasonally dry tributary of the Colorado River.

The irrigated ranch fields and the core developments of the ranch are sited on a series of narrow land terraces stepping up from Pigeon Wash. The irrigation system was constructed to take advantage of a gentle westward drop in the topography from the spring heads to the west holding pond and then, delivered down the slope and across to the three ranch fields. The rugged gullies between the fields were unsuitable for planting or grazing and remain mesquite and catclaw thickets that continue to create a natural divide between each field. Higher ground extending from the irrigation ditch over the north ridge was historically used as open range for the cattle.

Natural Resources

Water

The sole reason for prolonged human activity at Tassi is the constant supply of water from the natural springs. By the same token, it is this prolonged period of human use that has altered the natural hydrology, created new wildlife habitat, and even obscured—through excessive vegetative

growth, the number and position of spring heads. There are between three and four water sources at Tassi. The first source emerges from the ground 120 feet upslope from the ranch house. NPS hydrologist W. Werrill described it in 1977 as comprising "some seven or eight openings...oriented in a straight line and thus indicat[ing] strict geologic control." This source feeds into a ditch that runs approximately 1,000 feet to a holding pond west of the ranch core. The second source may lie under the spring box 1, which sits 73 feet northeast of the ranch house. Alternatively, the water source for this spring box, as a result of it being excavated into the ground, may simply be water from the high water table. This same buried water source has been channelled into a hose that emerges from the ground 24 feet southwest of the ranch house. During the Whitmore period of use at Tassi Ranch, this hose extended further and was used to fill a tanker truck the Whitmores would use to haul water to their grazing allotment. A final spring source emerges from the ground one-quarter mile northeast of the ranch buildings, along the entry road; water from this source was collected in spring box 2, directly adjacent to the spring. In 1936, the Arizona Division of Water Rights measured the flow of water at Tassi as 183,000 gallons per year. A 2002 survey documents the flow rate as significantly greater, measuring 75 gallons per minute or 39.4 million gallons per year. What is known for certain is that during the historic period and prior to development, all of the water from Tassi Springs flowed directly downhill into the wash.



Figure 11. Portion of the functioning irrigation ditch that collects water from the springs. This ditch historically extended to the outlying fields at the ranch. View looking west. (NPS, 2013)



Figure 12. Tassi Springs located on the hillside behind the building complex has historically created wet conditions. French drains installed by the NPS along with grading to divert water have mitigated but not eliminated the condition. View looking east from behind the barn. (PWR, 2012)

Ed Yates built his irrigation system in the 1930s to divert the water from the upper springs into the earthen ditches flowing to the holding pond west of the ranch core. The middle and lower spring sources were enclosed and piped for both irrigation and domestic use. Today, because the ranch buildings lie between the primary spring sources and the wash, seepage, flooding, and robust vegetation growth have been common challenges facing current maintenance crews for many years. The NPS has modified the topography behind the buildings and installed French drains around the house and outbuildings to drain boggy soils from the foundations and interiors of the three historic buildings.

Pigeon Wash adjacent to the ranch is usually dry, but it and other washes in the area can flood during seasonal rains. The strong flows from these flood waters do erode the banks of the channel from time to time and can create a direct threat to cultural resources at the ranch core.

Wildlife

Tassi Springs provide a permanent source of freshwater, which, in the context of the Mojave Desert, provide valuable aquatic and terrestrial habitat. Wildlife species that are endemic or have been re-introduced to the site require management and intervention to maintain or improve habitat. Two species—the [Grand Wash] Spring snail and Relict Leopard frog have habitat mainly within the functioning irrigation ditch, and protection requires sensitivity related to the timing of disturbances associated with potential maintenance activities.

Figure 13. Relict Leopard frog (center of the photograph) in the irrigation ditch near the ranch house. (PWR, 2012)



The Relict Leopard frog is a rare species that occurs within a restricted range along the Virgin, Muddy, and Colorado rivers, particularly in springs that feed those rivers. In lieu listing the frog under the Endangered Species Act, the species is being managed under a Conservation Agreement between Federal and State agencies. Tassi Spring was selected as a site for reintroduction, and in 2006, 175 were released at the spring. (Parashant Monument Managers Report 2010) It appears they are reproducing, and are now found in the spring heads, the stock tank, and the outflow from the French drain system in the ranch yard. Because of their protected status, the presence of these frogs places

restrictions on the amount and type of work that can be performed within the spring, the irrigation ditch, and other areas in which they are found. Work should be performed outside their spawning period.

Spring snails are located within the functioning portion of the irrigation ditch. Snail populations are the densest near the spring heads but they do live throughout the entire watered length of the functioning ditch. They require stable, year-round water sources with relatively slow water flow and open vegetation. (Interim Treatment Plan, 2007)

Mesquite growing below the springs, surrounding the ranch fields, and in Pigeon Wash provide important habitat for bird species including phainopepla (*Phainopepla nitens*), Lucy's warbler, and Bell's vireo. Although the presence of mesquite is natural in this environment, the extent of the thickets, especially in Pigeon Wash is much greater than during the historic period. Removal or thinning of this vegetation must balance the amount of habitat available to wildlife while preserving important spatial characteristics of the cultural landscape and historic setting for the ranch.

Vegetation

Native vegetation and plant communities evident at Tassi Ranch have been altered and influenced by historic land use and changes to the natural topography and hydrology. Today there are two primary native plant communities associated with Tassi Ranch. The first is the Mojave Desert Creosote Bush community which is characterized by desert holly (*Atriplex hymenelytra*), creosote (*Larrea tridentata*), sage (*Artemisia sp.*), mesquite (*Prosopis sp.*), Mojave yucca (*Yucca sp.*), arrow weed (*Pluchea sericea*), and teddy bear cholla (*Optunia bigelovii*) among other species. The second community—a desert riparian community, is found along washes, including Pigeon Wash, and often has stands of catclaw acacia (*Acacia greggii*) and Gooding's willow (*Salix goodingii*), which can be seen in abundance at Tassi Ranch. The woodier trunks of these species were often used in the construction of fences and corrals at the ranch.

Additional non-native and encroaching vegetation is evident around the ranch, and much of this growth is attributed to changes in the natural hydrology and development of the

irrigation system by Ed Yates and others during the historic period. However, it does appear that piping water from the spring to a stock tank at the edge of Pigeon Wash, and the overflow from a breach in the irrigation ditch has promoted the growth of the catclaw and mesquite that now comprise a dense thicket along the wash. These stands essentially follow the bottom of the wash as far as surface water from the springs can be seen. This is likely a condition which arose after the period of significance. In addition, thick stands of Gooding's willows and arrow weed have sprouted in and along portions of the irrigation ditches, a non-historic condition that impedes integrity of the channel, general function, and flow.

In the ranch fields, catclaw-mesquite thickets have sprouted in distinct areas. These thickets are sharply bordered by the lateral irrigation ditches, suggesting that they may be the result of formerly fallow areas, the last areas to be regularly watered, or the most heavily fertilized areas of the ranch.



Figure 14. Expanding thicket of mesquite growing along Pigeon Wash, west of the ranch core. View looking southeast. (PWR, 2012)

The only purposeful planting of vegetation at Tassi Ranch dating to the period of significance are the nine large Fremont cottonwood trees along the ranch yard fence. These cottonwoods are the most visible and distinctive vegetation at Tassi, creating the shady, environment near the ranch house and yard. Although cottonwoods were present at the site in 1917, the linear alignment of these trees across the front of the ranch yard suggests that both the trees and



Figure 15. Portion of cottonwood row located between the parking area and the ranch yard. View looking west. (PWR, 2012)

structures may have been established at the same time, ca. 1939. (Belshaw 1980, 108) The majority of the trees are mature and approaching senescence, although a number of suckers are present. Many have large limb failures, and others show evidence of advanced wood decay. (Swartzell 2001, 1) A number of other trees were trimmed and thinned in 2002 to address visitor safety and reduce hazards at the site. (Jones, 2002)

Spatial Organization and Land Use

Historically, land use at Tassi Ranch was dictated by the necessity of locating ranch functions in proximity to and down slope from the springs, while remaining above the seasonal flood levels in Pigeon Wash. The resulting east-west trending developments created three functional zones that spatially defined ranch operations during the historic period. These spatial and functional areas are the ranch core, the western ranch fields, and the up-slope rangelands.

The ranch core is characterized by a small cluster of vernacular structures, sited behind the row of cottonwood trees, and underneath their shady canopy. The ranch core includes the stone ranch house, wood barn, shed, corrals, spring box, and irrigation ditches adjacent to the springs on a terrace above Pigeon Wash. A small open area enclosed by the ranch house, barn, and corrals is currently covered in low-growing herbaceous vegetation and grasses. Siting desert ranch functions around a water source is not unique

in the Arizona Strip, but is an essential characteristic of desert ranches that is still evident today at Tassi Ranch.

The ranch fields cover approximately ten acres west of the core ranch area and above Pigeon Wash. The pastures and fields were irrigated, fed by a system of hand dug lateral ditches extending from the holding pond located on the slope above the fields. Within these fields, catclaw-mesquite thickets have sprouted along the former irrigation ditches, suggesting that they may be the last areas to be regularly watered. While these thickets do mark the locations for irrigation features, along with other thickets found along the wash and other irrigation ditches this vegetation is not historic and does not contribute to the character of the cultural landscape.

The up-slope range lands include areas beyond the maintained landscape and are beyond the scope of this report. The lands extending north for the developed and irrigated portions of the ranch were not fenced but small-scale features associated with operations and grazing activities remain, such as troughs and holding pens.

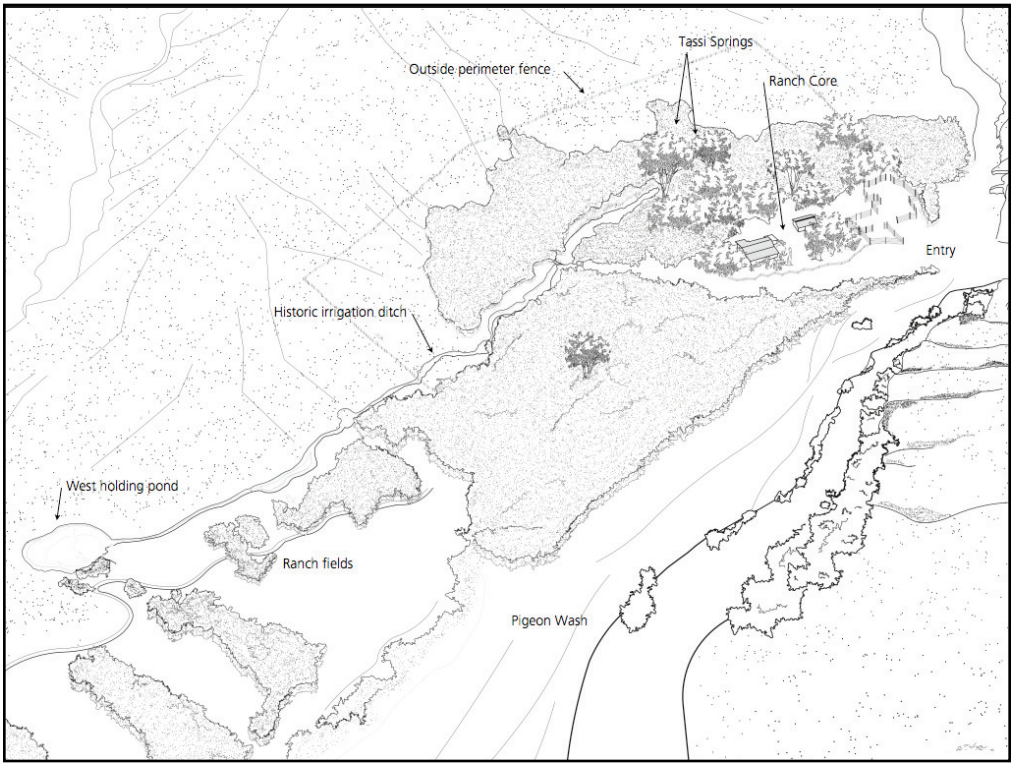


Figure 16. Sketch adapted from the HALS documentation of Tassi Ranch illustrating historic land use and the spatial relationships during the period of significance.

Circulation

The primary entrance road to Tassi Ranch--Pigeon Point Road (NP 1213), approaches the ranch from the northeast. It is a one-lane dirt road, approximately 12 feet wide. Across Pigeon Wash, this road continues and splits into two routes: Tassi Wash Road branches east through Box Canyon into Tassi Wash; and the second road, Pigeon Point Road (NP 1213), continues up-slope to the southwest. A locked gate in Box Canyon controls access to Tassi Wash Road. This route and the narrow corridor formed by Box Canyon were important circulation routes during the historic period, used for herding livestock to the ranch from grazing areas located beyond Box Canyon. Pigeon Point Road continues southwest past Tassi Ranch, leading to a plateau overlooking the ranch development. In the 1970s, Whitmore added a landing strip for his plane on top of the plateau. It is however, not known if this road predates the 1970s use.

A single utility road provided access to the far reaches of the ranch during the historic period. This road remains and originates at Pigeon Point Road in the parking area in front of the ranch yard and continues up-slope in a generally westerly direction. This is a road is approximately 10 feet wide, providing access to the west holding pond above the ranch fields. Above the building complex, a spur of the ranch road turns east across the slope to the spring area. It is unclear if this route is historic or if the spur continues beyond the springs, as heavy vegetation has obscured the route.

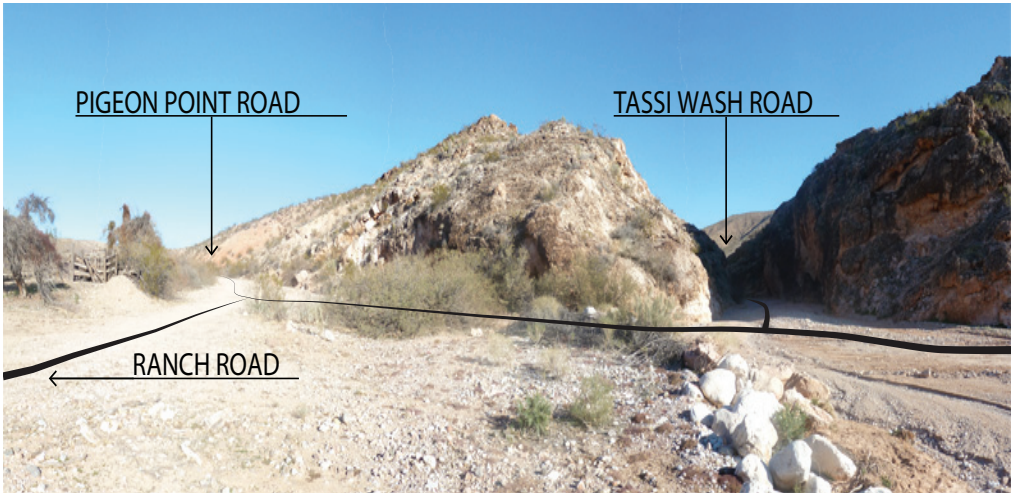


Figure 17. The entry area to Tassi Ranch where several roads intersect including the access road--Pigeon Point Road, the Ranch Road that continues west, and the route through Box Canyon, know as the Tassi Wash Road. View looking east. (NPS, 2013)

Figure 18 Annotated photograph showing the alignment of the historic ranch road as it extends from the entry and core of the ranch west to the holding pond and ranch fields. View looking west. (NPS, 2013)



Buildings and Structures

The ranch contains a small collection of vernacular structures that reflect considerable adaptation to building in a remote location. Sited more than 30 miles from the nearest town, Ed Yates and others used a variety of materials for construction of ranch structures. Some of these materials include railroad ties, dimensional lumber, field stone, concrete, corrugated metal, tar paper, plywood, wire, native vegetation, and mud.

Ranch House

The three-room ranch house was originally built in 1938 out of river stones with cement and mud mortar. Resting on concrete footings, the house has an irregular floor plan and roof line, but is generally square. The interior floors are poured concrete, separate from the building's footings. The gabled roof is formed of logs and dimensioned planks protected by corrugated sheet-metal panels on the outside. Windows are glazed, and a porch on the front of the house is enclosed with screening. The ranch house was the primary residence at Tassi Ranch after construction in 1938.



Figure 19. Photograph showing the enclosed front porch on the south side of the ranch house, and the east elevation. View looking northeast. (NPS, 2013)

The house is generally rectangular in shape, measuring approximately 36 x 31 feet. There are three interior rooms and two additions; a storeroom, and a bathroom. The main room in the house is approximately 31 x 9 feet with screened windows running the full length of the south wall. Windows are also located on the east and west elevations. The northeast corner room, approximately 14 x 16 feet has windows on the north and east sides. The northwest corner room measures approximately 15 x 16 feet and has a fireplace on the north wall and a west-facing window. A small hatch with a wood door, located left of the fireplace, provides a pass-through for supplies from a small storeroom on the north wall of the house. This storeroom is accessible through a dedicated exterior door on the west side. The walls of the storeroom are mortared fieldstone like the main structure of the ranch house. In contrast, the bathroom addition on the east side of the ranch house is built of rough coursed rectangular stones. It has a flat-roof, windows on each wall, and an external door on the south. An internal partition divides this addition into two spaces, a south room with a sink and a north room with a concrete bathtub/shower enclosure, a hot-water tank, and a drainpipe.

Figure 20. Bathroom addition on the east elevation of the ranch house. (NPS, 2013).



Ed Yates claimed to have built the ranch house in 1938 with the assistance of his son. He also claimed he built it with the help of one or both of the Hecklethornes. Other claims have been made that one Keith Nay built it at an unknown date and that a man named Oldfield built it in the late 1920s or early 1930s, although these may be in error or may refer to the previous ranch house on the site.

The stones from an earlier ranch house noted by visitors in 1917 and 1918 may have been incorporated into the existing house. The bathhouse addition was built after 1947, as it does not appear in photographs of the ranch taken at that time.

Barn

Located east of the ranch house, the barn is a rectangular shape structure approximately 24 x 17 feet. It has a field stone foundation and is built of railroad ties, stacked with notched and lapped ends. The pitched wood frame roof is covered by corrugated sheet-iron panels. The building contains two spaces; a large outer room measuring approximately 14 x 15 feet which is open to the yard, and a small inner room measuring approximately 8 x 15 feet with window opening on the south and west. The barn has dirt floors. A wood and wire coop, now in ruins, is attached to the northeast corner. Photographic evidence reveals the barn was built before 1947.

Figure 21. Barn building with opening on the south side. (NPS, 2013)



Shed

The shed is a small rectangular, gable roof structure measuring approximately 9 x 12 feet and is sited approximately 25 feet west of the ranch house. The wood-frame structure has board siding. The roof has board sheathing and is partially covered with tar paper. Screened windows are located on the east and west walls. A square opening in the south wall covered by sheet-metal panel with a circular hole suggests a stove may have been placed in the shed. It is possible the building was used as sleeping quarters or possibly or storage at one time. Photographic evidence indicates the shed was built after 1947.



Figure 22. East elevation of the shed,located west of the ranch house. (NPS, 2012)

Constructed Water Features

Clearly one of the most significant structures built during the period of significance is the water system tied to the natural springs. Although comprised of many parts, the system is relatively simple and allowed for the irrigation of ranch fields with a moderate amount of upkeep and infrastructure, while using the existing topography and water sources for delivery. This system is comprised of the following parts.

East Holding Pond

Located in a pasture above the ranch yard, the east holding pond is a dry pear-shaped depression, roughly 33 x 19 feet.

A single earthen ditch runs from the depression about 180 feet east to the ranch perimeter fence, where, if there was water in the ditch, it would drain down the slope toward the access road. This ditch may have once served as an irrigation ditch for the small upper pasture. An additional fragment of unconnected ditch is located approximately 130 feet southeast and may reflect a remnant portion of the functioning system. There is no apparent way to fill this pond, as there is no evidence of any connections between it and the spring heads down slope from the pond. The date for the pond has not yet been established but may have been constructed by the Whitmores.

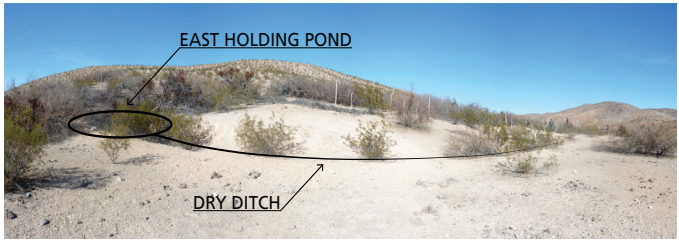


Figure 23. Depression forming the east holding pond is less defined than the west holding pond, but still discernible above the ranch complex. (NPS, 2013)

West Holding Pond

A second, larger earthen holding pond is located above the fields west of the ranch core. It is approximately 80 x 113 feet in size and 9 feet deep. Filled to its rim, it would contain about 42,500 cu. ft. of water.

The west holding pond has two drains; one at the bottom of the depression and one along the upper edge. The lower drain, controlled by a valve, was designed to direct water south through the lower reservoir wall. From there the water flowed downhill along and across the ranch fields to the south and east. The upper drain prevented water from overtopping and eroding the reservoir walls by passively

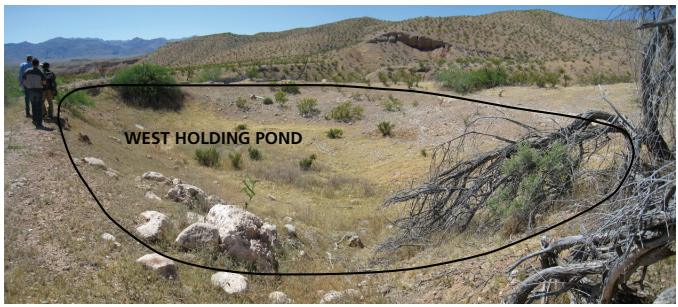


Figure 24. The west holding pond remains a relatively large structure associated with the historic irrigation system, supplying water to the ranch fields. (NPS, 2013)

draining water to the west through the top edge of the pond. The water then flowed downhill across the fields to the south and west.

Irrigation Ditches

The primary irrigation ditch at Tassi Ranch is an earthen structure, approximately 1,000 feet long. This ditch historically carried water from the spring heads above the ranch house, to the west holding pond. From the holding pond, two additional ditches branch into several lateral ditches between the pond and fields to the south and west. Furrows are still evident in the ranch fields running down slope from the lateral ditches.

The primary irrigation ditch from the springs has breached in a number of places and no longer carries water to the west holding pond. Some of these breaches are the result of disturbances from feral livestock, invasive vegetation, and the erosive action of flowing water. The primary breach was constructed by the NPS and carries water from the spring heads to an outflow into Pigeon Wash.



Figure 25. A portion of the primary dry irrigation ditch showing the dimension and scale of the ditch. (NPS, 2013)



Figure 26. Spring box #1 located on the slope behind the barn. (NPS, 2013).



Figure 27. Spring box #2. View looking northwest. (NPS, 2013).

Figure 28 Stock tank located at the edge of the ranch yard near the fence. View looking northeast. (NPS, 2012)



Spring Box 1

Spring box 1 is located about 70 feet northeast of the ranch house and is approximately 4.5 x 4 feet in size. The footing of the walls are below grade and the walls are comprised of fieldstone and cement. The structure has a sloping wood hatch cover, installed by the NPS. The box is located downhill and east of the primary spring heads. It is unclear if the water associated with this catchment is from a spring head located under the box, or the result of the high water table. A pipe, no longer functioning, historically supplied water from the spring box to the bathroom addition of the ranch house. The construction date for the spring box is unknown, but historian Mike Belshaw notes that Ed Yates "cleaned and cemented the springs" during the 1930s, and this may refer to the construction of this spring box.

Spring Box 2

Located one-quarter mile northeast of the ranch core, this 6.5 x 4.5 foot rectangular, fieldstone spring box sits adjacent to a spring head. It may date from 1940, when Ed Yates filed a water-rights application for this spring.

Stock Tank

A relatively small 9 x 4 x 2 foot metal stock tank is set into the ground near the line of cottonwood trees, 25 feet southwest of the ranch house. Water from spring heads above the ranch house is channelled to the tank by a partially buried hose. This hose, once longer in length, was used to fill a tanker truck that allowed the Whitmores to haul water to other stock tanks located throughout their grazing allotments. Originally, the overflow from the metal stock tank flowed downhill along Pigeon Wash; now, a hole in the tank permits water to seep directly into the ground, creating moist soils, which in turn, have created new habitat for the Relict Leopard frog.



Figure 29. Detail of binding techniques used on the fences around the corral. (NPS, 2012)

Fencing

Much of Tassi Ranch is enclosed and spatially organized by approximately 5,700 linear feet of fencing. This fencing historically enclosed the irrigated fields and controlled the movement of cattle throughout the ranch. Fence materials vary considerably, and include wood, metal, and wire reflecting the use natural resources, and innovation related to the use of materials and construction techniques in a remote location. Since the period of significance, and as fences fail, the NPS repairs segments as needed, specifically to protect both the natural environment and the historic buildings from potential damage from feral livestock.

The primary fence material used throughout the ranch is barbed wire, sometimes supported by metal posts, and in older sections of the fence line, strung between rough wood posts fashioned from native vegetation. Fences define five main boundaries: four fence lines create a perimeter around the extent of developed ranch; and one fence line divides the ranch east to west. The north boundary fence line runs for approximately 2,240 feet along the northern edge of the up-slope grazing lands. The western fence line is extant for approximately 340 feet. A 92 foot section is missing from this section. The southern fence line follows the north side of Pigeon Wash approximately 2,500 feet. Part of this line is obscured by dense vegetation, however field investigation indicates that approximately 770 feet of the fence has collapsed or is missing altogether.



Figure 30. Perimeter fence at Tassi Ranch showing the original use of native vegetation for posts. (NPS, 2012)



Figure 31. Wood fence built by the NPS to protect historic structures in the ranch yard. (NPS, 2011)

A short section of worm style wood fence is located between the entry road and ranch yard. This fence was installed by the NPS in 1994 to replace a post-and-rail fence that historically defined the ranch yard.

Corrals anchor the southeast corner of the overall ranch fence system, connecting the southern alignment with the eastern alignment, which continues uphill for about 270 feet to the northeast corner of the ranch. The middle fence runs north to south approximately 220 feet and separates the 5 acre ranch core from the fields and pastures to the west.



Figure 32 (top) **and 33** (below). A variety of materials, and fastening techniques were used to construct the corrals at Tassi Ranch. (NPS, 2012)

Corrals

The corrals are located on the east side of the ranch core. Constructed of salvaged lumber, railroad ties, and with many of the rails lashed to posts with wire, the corrals were historically divided into ten pens with a central chute (CLI, 2003). Gates in the corrals are located on the west, and on the south, allowing access between work areas and transportation.



Lambing Pen

The lambing pen is located along Pigeon Wash, approximately 1.5 miles from Box Canyon. Constructed of dry stacked stone, the walls are approximately 3-5 feet high. The structure is located at the base of a steep hillside and incorporates the hill to form one side of the U-shape enclosure. The walls enclose a space approximately 4,500 square feet in size. Small portions of the walls are missing or have failed; however the majority of the structure appears intact.



Figure 34. The walls of the lambing pen incorporating the hillside to create a portion of the enclosure. (NPS, 2010)

Archaeological Resources

Tassi Ranch lies about one mile south of the Grand Wash Archaeological District, established in the 1970s after archaeological surveys on mineral-lease tracts found evidence of Native-American occupation in the area possibly dating back to 3000 BC. In 1999, three archaeologists from National Park Service's Western Archaeological and Conservation Centre spent two weeks evaluating historic and prehistoric resources at Tassi Ranch. They discovered 33 lithics and 17 ceramic fragments in two study areas, one in the former irrigated fields and the other in the up slope pasture immediately east of the small holding pond.

Views and Vistas

Historically, the character of the landscape surrounding the core area of Tassi Ranch was generally open with sparse desert vegetation, or woody materials that were often harvested as building supplies and fuel. As a result, views from the ranch house were mostly open extending down the valley, and out to the surrounding mountain ranges. Today, much of this open character—especially in the vicinity of the ranch house has been lost due to the expansion of the Mesquite thicket south and west of the core area.

Figure 35. View of the ranch core ca. 1947 showing much more open views between the ranch core and Pigeon Wash. (Lake Mead Collections)

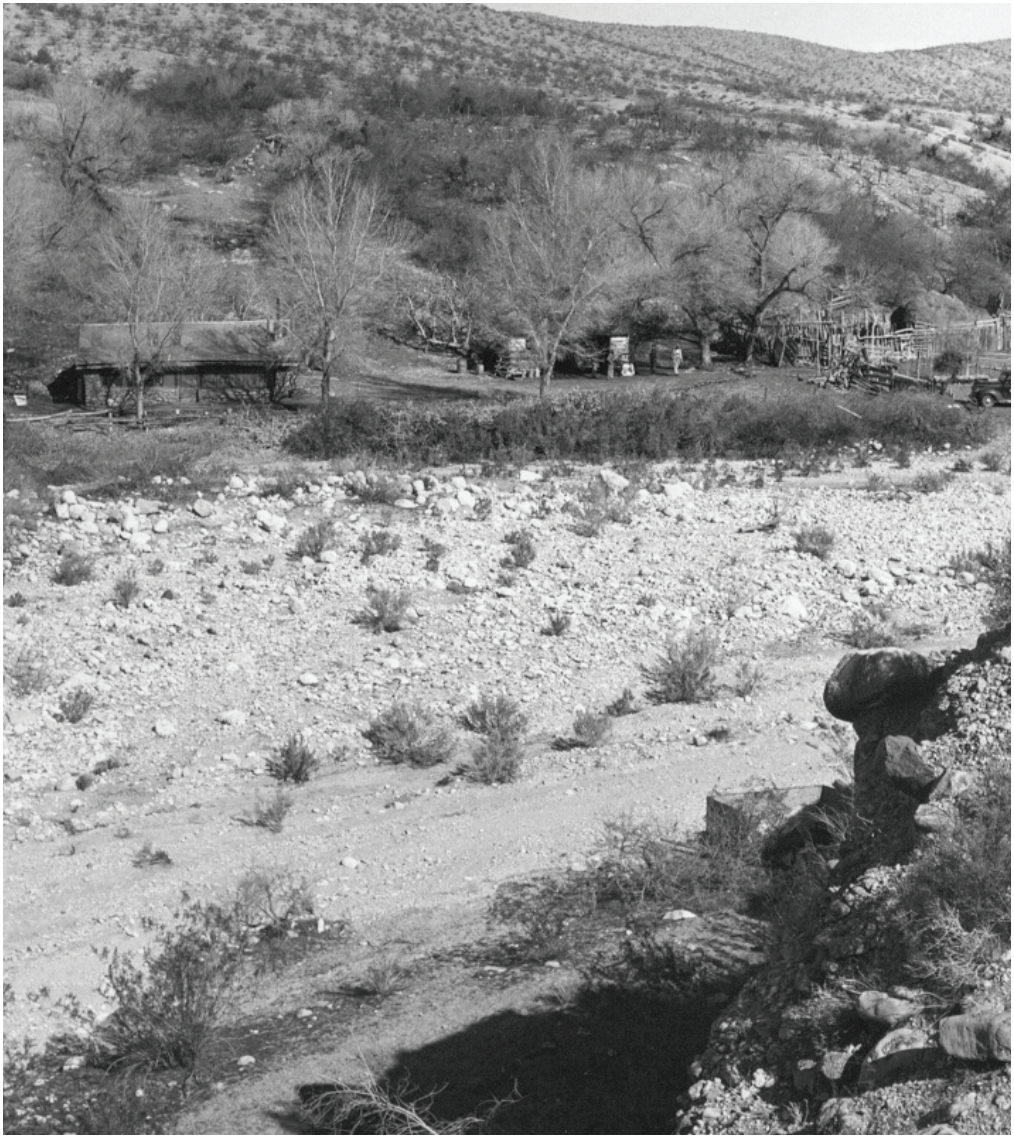


Table of Contributing Resources for the Proposed Tassi Ranch Historic District

Contributing Resources	LCS Name	IDLCS No.	Park No.
Cottonwood Row	Cottonwood Row	993367	N/A
Irrigation System	Tassi Ranch Irrigation System	55695	HS-22D
• **Functioning Irrigation Ditch** • **Non-Functioning Irrigation Ditch** • **East Holding Pond** • **West Holding Pond**	**Tassi Ranch Irrigation System**	55695	**HS-22D**
• **Spring Box 1**	Tassi Ranch Cistern	55667	HS-22G
• **Spring Box 2**	Tassi Ranch Stone Well	55660	HS-22E
Tassi Ranch Road	Tassi Ranch Road	993358	N/A
Ranch House	Tassi Ranch House	55656	HS-22A
Barn	Tassi Ranch Barn	55657	HS-22B
Shed	Tassi Ranch Shed	55658	HS-22C
Fences and Corrals	Fences and Corrals	55661	HS-22F
• **Perimeter Fence** • **Core Protection Fence** • **Corrals**	Fences and Corrals	55661	HS-22F

Part 2: Treatment

Introduction

The primary document outlining preservation treatments for cultural landscape resources and historic structures at Tassi Ranch is the *Tassi Ranch and Springs Interim Treatment Plan,* 2007 (Interim Treatment Plan). The Interim Treatment Plan is the product of an interdisciplinary workshop, held in the park in 2006. The workshop brought together resource specialists, park staff, managers, and partners to identify resource and visitor safety issues at Tassi Ranch, and develop short term treatment recommendations for stabilization. The Cultural Landscape/ Historic Structures Report (CLR/HSR) builds directly from the this plan and provides treatment recommendations for long term preservation of contributing resources associated with the 31-acre historic ranch.

Because Tassi Ranch no longer operates as a working ranch, and is located in such a remote area of the park, treatment recommendations focus on realistic and sustainable preservation maintenance practices to assure visitor safety, protection of resources, and to the degree possible, preemptive mitigation of environmental events such as flash floods that can devastate resources.

No attempt is made to restore or reconstruct the property to a specific date. Rather, the goal for treatment is to stabilize and preserve significant cultural and natural resources defining the historic character and environmental setting of Tassi Ranch.

Primary Treatments

Preservation is the primary treatment applied to the ranch and includes both stabilization and preservation of extant historic structures—such as the main ranch house, the barn, corrals, and components of the irrigation system. Stabilization is the minimum treatment applied to all contributing resources, and in some cases, may also reflect ultimate treatment. This is the case with the historic irrigation ditches, which no longer carry water to the full extent they did during the historic period. Today, without the requirement to maintain irrigated fields, ultimate treatment is limited to stabilization assuring the historic alignment, profile, and character of the historic ditches are

retained, without preserving the historic function of the earthen ditches to convey water to the fields. Rehabilitation is the secondary treatment applied to the site and addresses the need to maintain historic character while allowing the use of compatible contemporary materials that are more sustainable over time. An example of this treatment is the decision to retain the section of fence between the ranch core and the parking area. This zig zag style fence is not historic but is compatible with the character of other historic ranches in the Arizona Strip. From a maintenance perspective, this fence is more sustainable than the rail fence that was here during the historic period, because it has a simple construction, is more stout and hence more successful at keeping feral stock out of the ranch yard, and may remain functional over a longer period of time.



Figure 36. Park maintenance staff constructing the zig zag fence between the ranch yard and the entry area. (PARA, 1994)

All treatment recommendations for Tassi Ranch are predicated on and are consistent with guidance provided in National Park Service Director's Order 28: *Management of Cultural Resources*, and with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. Additional compliance and in some cases, additional permits may be required prior to implementation of recommendations made in this report.

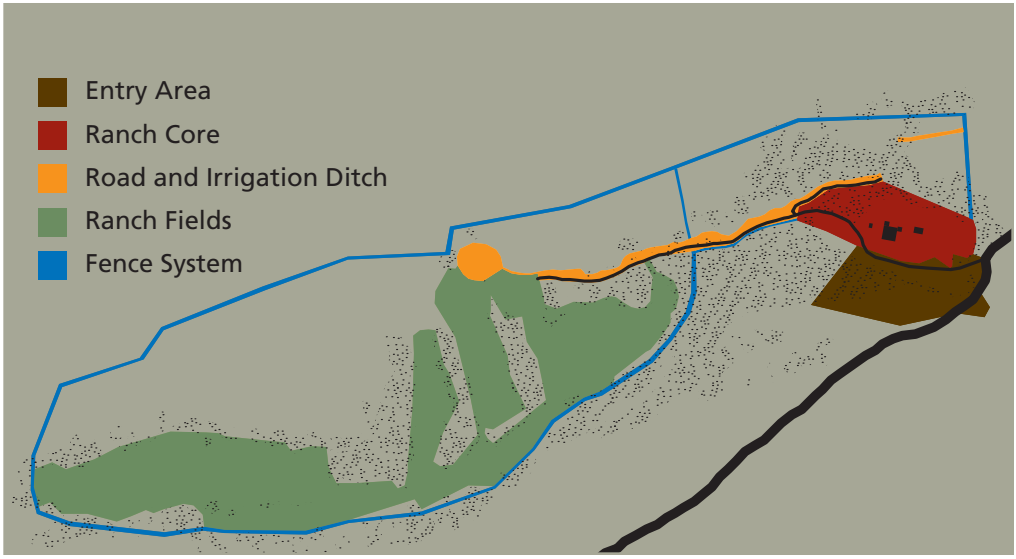
Format for Treatment Recommendations

Treatment recommendations for cultural landscape resources and historic structures at Tassi Ranch are made within the framework of the park Facility Maintenance Management System (FMSS).Recommendations are

further organized into five management zones based on historic use and function, current preservation issues, and the level of maintenance required to achieve management goals. For each management zones, preservation issues and treatment goals are summarized to provide the focus for recommendations.

Management Zones and Assets	
Entry Area	
• Pigeon Wash Revetment/Channel	
• Parking Area	
• View to Pigeon Wash	
Ranch Core	
• Ranch House	• Corral
• Barn	• Cottonwood Row
• Shed	• Spring Structures
• Ranch Yard	• Yard Drainage
• Yard Fence	• Stock /tank
Road and Irrigation Ditch	
• Ranch Roads	
• Functioning Irrigation Ditch	
• Dry Irrigation Ditches and Holding Ponds	
Ranch Fields	
• Ranch Fields	
Fence System	
• Core Protection Fence	
• Perimeter Fence	

Figure 37. Management Zones for the maintained landscape and historic structures at Tassi Ranch. NPS, 2013.



Entry Area

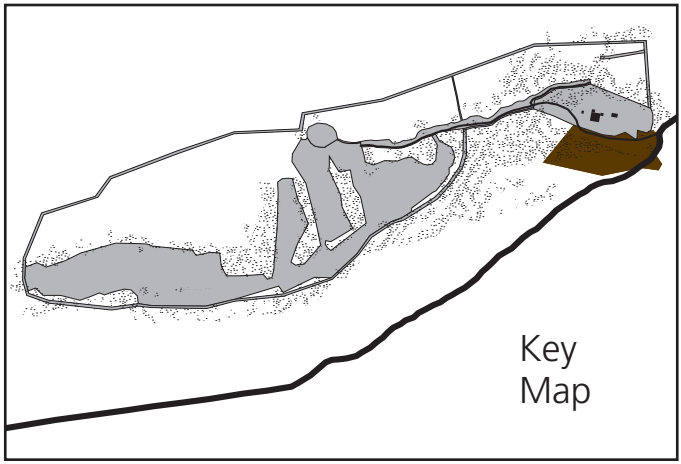
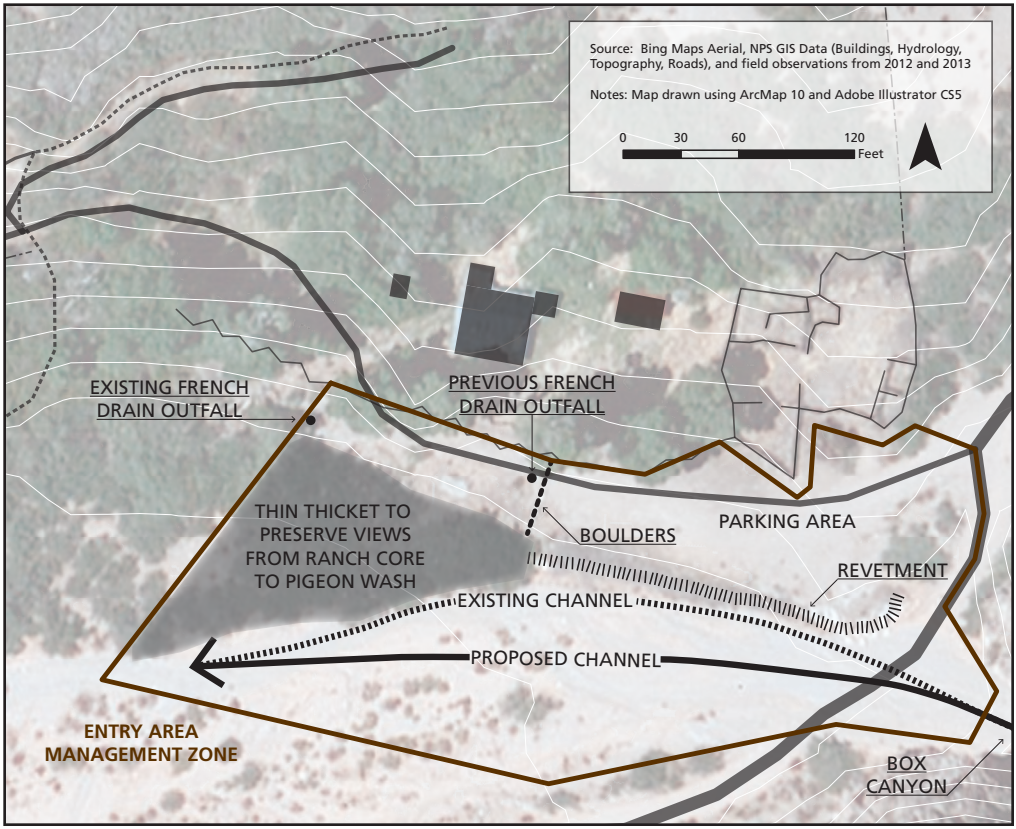


Figure 38. Illustration of proposed treatment recommendations for the Entry Area Management Zone, Tassi Ranch**.** (NPS, 2013)



Treatment Goal

The goal for treatment is to protect the terrace above the revetment from flash flooding.

PIGEON WASH REVETMENT/CHANNEL

Issue and Deficiencies

Following a major flood event in 2000, a large area in front of the Ranch Core was severely eroded. That year, the NPS constructed a boulder revetment along Pigeon Wash, re-graded, and added fill behind the boulders to meet grade at the entry. This revetment defines the south edge of a sizable terrace that extends north to the toe of the slope behind the ranch house. The majority of historic ranch structures are located on this terrace.

Periodic flash-flooding through Box Canyon continue to move the channel of Pigeon Wash toward the base of the revetment. Without relocating the existing channel, the revetment is vulnerable to the erosive forces of flash floods resulting in sever undercutting and creating unstable slope conditions. During the historic period and over the years, gravel and boulders from the channel of Pigeon Wash have been used to fortify the terrace and divert water away from the ranch core.

Treatment Recommendations

1. Consult with geomorphologist or other technical expert to determine viable and sustainable method(s) for relocating the channel and stabilizing the revetment relative to flash flood events through Box Canyon and Pigeon Wash.

2. Relocate active flood channel away from toe of the revetment by re-contouring Pigeon Wash

    - Excavate a 3-5ft deep, flat-bottom channel, between 5-10ft wide to create a new flood channel



Figure 39. Proposed realignment of the Pigeon Wash channel will require a permit from the Corps of Engineers. View looking west down the existing channel. (NPS, 2012)

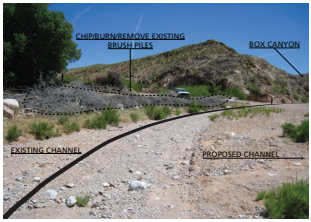


Figure 40. Illustration showing the proposed realignment for the Pigeon Wash channel west of the ranch core, and the large piles of brush and debris currently stored on the north bank of the channel. View looking east. (NPS, 2012)

near the center of Pigeon Wash, parallel to the entry/parking area revetment. (See figures 31, 32)

- Preform work in dry conditions. Monitor integrity of new channel for flood damage after flood events.

3. Remove all existing brush piles in the revetment by chipping, burning in Pigeon Wash, or hauling off-site.

PARKING AREA

Issues and Deficiencies

The parking area for Tassi Ranch is located between the Pigeon Wash revetment and the ranch core. This utility area was historically used for staging ranch operations and parking vehicles. Currently, visitors park their vehicles over a wide area, causing some erosion and generally expanding the extent of the historic entry.

Treatment Recommendations

Treatment Goal

The goal for treatment is to clarify the extent of the current parking area; reduce general erosion on the shoulders of the revetment; and improve visitor arrival sequence.

1. Encourage visitor parking to the east (near the corral) and south sides of the current entry area to provide shade and maintain a more historic setting immediately in front of the ranch yard.

- Place rocks and boulders as needed to define the western extent of the allowable parking area associated with visitor arrival and entry to the ranch.

2. Install hitching posts in shaded areas as needed for equestrian use. This may reduce the need to tether horses to the yard fence, reducing potential for damage to the fence.

3. Remove all existing brush piles by chipping, burning in Pigeon Wash, or hauling off-site.

VIEW TO PIGEON WASH

Issues and Deficiencies

In 2009 a French drain was installed near the ranch house to help direct spring water away from the historic structures. Over time, the out-fall for the French drain into Pigeon Wash has created a year-around flow of water flow into the wash, and this in turn, has contributed to an artificial expansion of the mesquite thicket in the area. The extent and character of this thicket has varied over time but has expanded a considerable distance west along the wash. Historically open views from the ranch house to Pigeon Wash are now obscured making it difficult for visitors to understand the historic setting and environmental context for the ranch. In addition, this out-fall into the wash has created new wildlife habitat areas that did not exist during the historic period, but are now considered valued resources worthy of protection.

Treatment Recommendations

Treatment Goal

The goal for treatment is to re-establish more open views between the Ranch Core and Pigeon Wash while preserving habitat for wildlife.

1. Reestablish historically open views from the Ranch Core south to Pigeon Wash by selective thinning of mesquite trees in the entry area and west of the Pigeon Wash revetment.

- Work with natural resources staff to assure tree cutting and thinning occurs outside of nesting season.
- Flush-cut trees less than 3 inches in diameter, level with the ground.
- Prune and thin selected trees larger than 3 inches in diameter to open views between ranch core and Pigeon Wash.
- Remove all brush by chipping, burning in Pigeon Wash, or hauling off-site.
- Monitor and schedule recurring maintenance of mesquite thicket every 2-3 years, including management through controlled burn, manual removal, and/or supervised work sessions.

Ranch Core

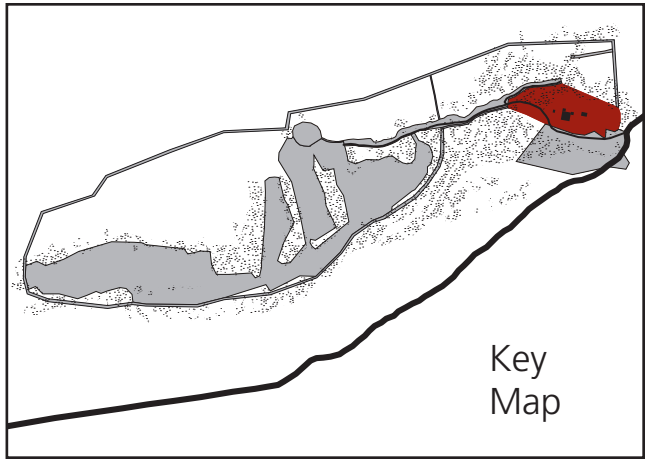
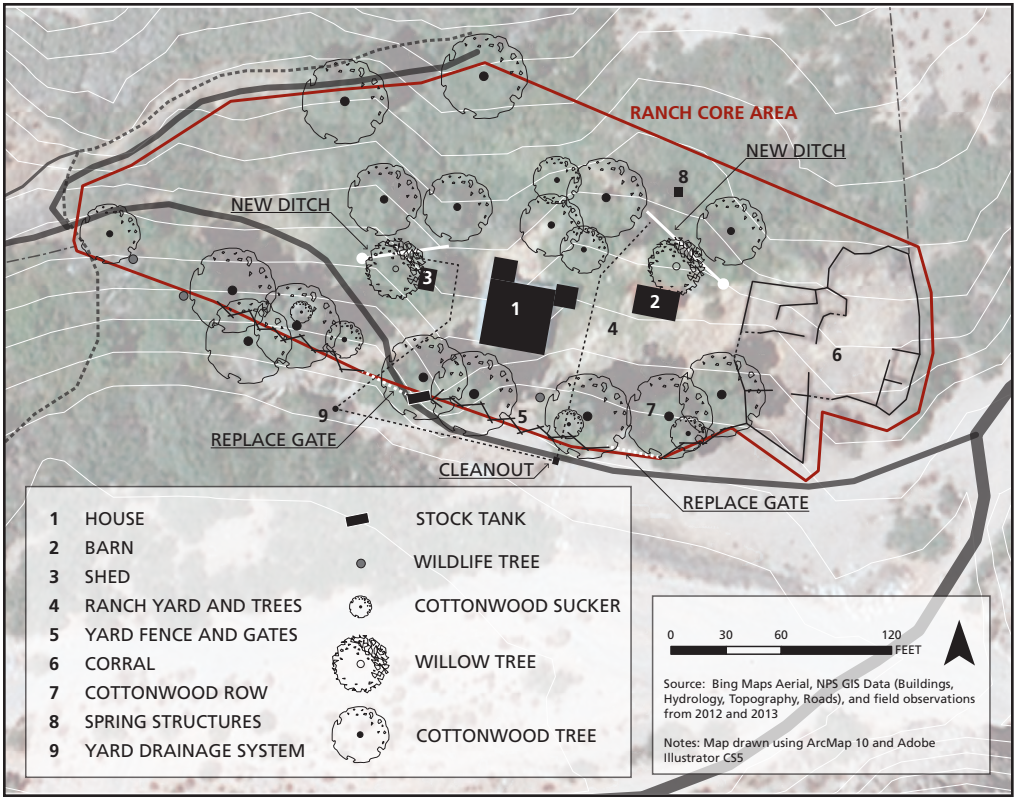


Figure 41. Illustration of proposed treatment recommendations for the Ranch Core Management Zone, Tassi Ranch**.** (NPS, 2013)



RANCH HOUSE

Issues and Deficiencies

Site: Like the other buildings in the Ranch Core, standing water is seasonally present in the interior and around the exterior of the ranch house. The source of this water are the springs on the hillside north of the building. The amount of water flow from these springs fluctuates seasonally and the wet condition around the structures is compounded by the dense clay subsoil creating a situation where water pools or drains until it reaches this clay layer and then sheets towards Pigeon Wash. Although a constructed berm on the south side of the ranch house diverts surface water to either side of the ranch house, it is not entirely successful in keeping the house dry in the winter months.



Figure 42. Photograph of the Ranch House in 1946, showing the stone wall exterior and railroad ties used to hold down the metal roofing, and the fascia boards. (LAKE archives)

Roof: The roof system consists of a board formed structural frame with cavities filled with concrete. The depth of the concrete varies but averages about four inches overall. Galvanized metal nailed to the structural frame covers the concrete and provides the finished roof surface. In 2006 the southwest corner of the house was damage when a large

cottonwood tree branch fell on the roof. Although the damage was not extensive, repairs to the porch rafters and roof system were required. The structural frame and concrete lining are in good condition. Currently the metal roofing is in satisfactory condition but is loose in places making it susceptible to damage by wind. Based on historic photographs and site investigations, it appears that railroad ties and heavy timbers on the roof are used to hold the galvanized roof in place. The gable end fascia pieces are comprised of 3x milled lumber. These members have separated over time, and are held together with metal strapping.

Exterior Stone Foundation and Walls: In some places recent repairs to the mud and sand mortar joints comprising the stone foundation and walls show varied levels of craftsmanship in the application of the mortar and based on historic photographs, many of these repaired areas are visually and materially incompatible with the historic fabric. The mortar in the bed joints seems excessive and obscures the original character of the field stone. This excessive mortar has also caused some discoloration of the stone. The structural integrity of the foundation and walls appears to be good.



Figure 43. Contemporary photograph showing the east elevation of the ranch house. Note the buildup of mortar below the windowsill on the left covering the original field stone, compared with the historic photo in figure 35. Bathroom addition pictured on the right. (NPS, 2013)

Interior: While there was no indication of standing water during the last site visit (Winter 2013), it is reported by park staff as an ongoing issue. Except for the front porch, all floors are dirt. There is old construction material and wood and other debris stored inside the building, including lumber on the floor that appears to be used for walkways when there is standing water in the rooms. The porch has a concrete floor that has heaved and cracked over the years due to the subsurface water condition described in "site drainage" above. The resulting finished surface is very uneven. The surface of the interior stone walls are in a condition similar to that described above under "exterior stone foundation and walls."

Windows and Doors: There are 7 window openings in the ranch house. Several are missing sash or components of the sash and need repair. Of the 6 doors in the house, 3 are in need of repair; the door located in the northeast room, the storage room door, and the door to the bathroom.

Bathroom Addition: The bathroom addition postdates the proposed period of significance for the ranch. Although there are no specific issues related to condition of the addition, removal may be considered at a future date based on a final determination of eligibility and assessment of integrity for the ranch house. The rough-course field stone and concrete mortar wall are in need of some re-pointing. The plumbing system has long been abandoned.

Treatment Recommendations

Treatment Goal

The goal for treatment of the ranch house is preservation, focused on stabilization and repair to preserves character defining elements of the structure and assure long term interpretive value.

Site

1. Correct drainage issues surrounding the building foundation to eliminate water seepage into the building interior.

2. Monitor conditions around the perimeter of the building twice a year to ensure efficacy of the new [proposed] site drainage system.

3. Follow recommendations in "Ranch Yard Management Zone" section of this report for management of vegetation that may pose a threat to the structure.



Figure 44. The front of the ranch house showing the damaged facia boards on the west elevation and metal strapping holding them together. Also note the lumber on top of the metal roof, holding it in place. (NPS, 2013)

Roof

1. Inspect roofing system annually to assess condition and repair needs.

2. Retain historic metal roofing integrating the replacement of deteriorated sections on an as needed basis only.

- Re-attach loose boards at eaves with 10d common nails.

- Re-secure gable end fascia boards using 6" heavy duty wood screws (such as Timber-lok). Remove metal ties after repairs.

Exterior Stone Foundation and Walls

1. Monitor mortar for cracks and deterioration annually.

- Record findings form the inspection graphically using photographs or sketches showing the location, length, depth, and width of cracking.

- Document perceived cause of cracking and indicate if just visually noticeable, or if it poses a structural threat to the building.

2. Ensure that future re-pointing of the stone walls and foundation employ the mortar mix used and documented for the 2000-2003 ranch house repair. Materials used included local mud (25%) and sand (75%).

- Assure work is performed under the supervision of a mason skilled in historic stone masonry.
- Prioritize repairs based on findings from annual inspections.
- Correct recent inappropriate repairs (excessive mortar in joints, discoloration of stone caused by excessive mortar).
- Ensure all future re-pointing and repair is detailed in a materially consistent and visually compatible manner.

Interior

1. Repair interior stone walls as needed, using treatments described above in "Exterior Stone Foundation and Walls."

2. Remove all lumber and other building material and debris currently being stored in the structure.

- Consider storing materials for future repairs in the rafter space of the barn.



Figure 45. Interior fireplace located in the NW portion of the ranch house (NPS, 2013)

3. Inspect all interior surfaces annually and remove any accumulated debris that may attract pests.

4. Place two-inches of pea gravel in the northwest and northeast rooms to help create a dry floor condition.

Doors and Windows

1. Conduct a door and window assessment. Use photographs or sketches to show location, dimensions, condition, and needed repairs for each unit.

2. Repair windows based on the assessment.

- Evaluate the repairs required and determine if repairs are best accomplished in a shop setting.
- Ensure all repairs—both on site and in the shop, are accomplished in compliance with the *Secretary of the Interior's Standards*.(See Appendix A)
- Ensure all work is performed by a person skilled in preservation maintenance with knowledge and skill working with the repair and replacement of historic wood windows. Ideally, the same person completes both field (removal and reinstallation) and shop work.

3. Clean window screens annually to provide maximum air movement and ventilation.

4. Keep doors closed to secure the building and to help provide structural stability.

Figure 46. Interior partition in the bathroom addition. (NPS, 2011)



Bathroom Addition

1. Monitor the condition of the mortar joints annually.

- Repair missing or heavily cracked cement-based mortar (larger than ¼") using compatible mortar mixture

2. Secure the building envelope and to provide structural stability.

Figure 47. The bathroom addition on the east elevation of the ranch house, was constructed sometime after 1947. View looking northwest. (NPS, 2013)



- Assess the condition of window and doors per the recommendations above.

- Repair door and window sash to working condition.

3. Mitigate dampness and create dry condition inside the structure.

- Add pea gravel to floor to disperse moisture.

- Remove debris and litter around exterior foundation and in the interior as needed to mitigate retention of water and to reduce intrusion by pests.

SHED

Issues and Deficiencies

Site: The shed is sited west of the ranch house at the toe of the slope south of the springs. This area of the Ranch Yard is often quite wet due to spring seeps and drainage patterns through the site. Although some grading was done to divert water behind the shed and a French drain was installed near the building to collect water and promote drainage around the building—the area remains seasonally wet. Water tends to pool in the interior, saturating structural members. A buildup of duff has also accumulated in the interior allowing herbaceous vegetation to seed and grow. The shed postdates the proposed period of significance for the ranch. Removal may be considered at a future date based on a final determination of eligibility and assessment of integrity for the property.

Roof: The roof is comprised of roll roof sheeting and appears loose at the rafter ends and is torn or missing in places. Rafter tails appear damaged or in some cases, broken. Willow limbs from an adjacent tree also rest on the roof of the structure.

Structural System: Based on field observations, the shed is pitched approximately 5 degrees of vertical. Window and door openings are damaged or missing altogether and the structure envelope is not secure.

Floor: The floor is dirt with encroaching vegetation and duff.



Figure 48. Photograph of the shed showing woody vegetation overhanging the roof and hanging rafter tail on the right. (NPS, 2013)

Windows and Door: The door needs to be replaced. The windows are screened and are part of the building's structural frame.

Treatment Recommendations

Treatment Goal

The goals for treatment of the shed are stabilization to maintain structural integrity and mitigation of wet soil conditions around the foundation to prevent further decay.

Site

1. Correct drainage around the building to mitigate wet soils and reduce damage to foundation from saturation, encroaching vegetation, and pests. (See recommendations Ranch Core Management Zone, "Ranch Yard Drainage").

2. Follow recommendations in Ranch Core Management Zone, "Ranch Yard" section for management of vegetation in relation to potential damage to structures.



Figure 49. South elevation of the shed showing the estimated five degree pitch in the structural framework. (NPS, 2012)

Roof

1. Inspect condition of the roof under sheeting and repair or replace where necessary.

- Re-fasten at each roof rafter with 8d hot-dipped galvanized common nail.

2. Repair and/or replace roll roofing in kind to match existing green material.

3. Repair any broken rafter tails using discreet 1x sistering and additional screws through roof sheathing.

Structural System

1. Add interior bracing to reinforce and bring building to plumb.

- Use springboards, jacks, and 2x4's as needed to determine alignment.
- Add diagonal bracing to north interior wall to help eliminate racking.
- Re-fasten loose or failing connections with compatible fasteners.

2. Inspect lower boards and bottom of wall studs annually to assure viability.

- Replace where necessary with in-kind material or sistering new members to the original.

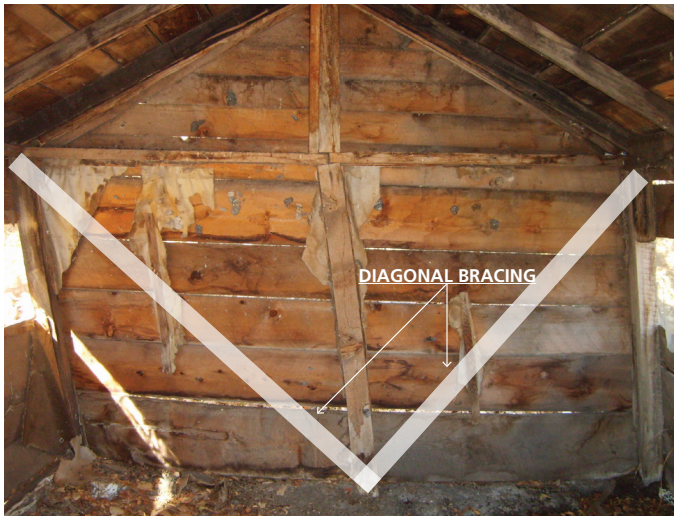


Figure 50. Adding diagonal bracing on the north wall of the shed will help stabilize the structure. (NPS, 2013)

Windows and Door

1. Reconstruct the shed door and reinstall to secure the structure.

2. Replace all window screens once the structure is stabilized.

Floors

1. Remove encroaching vegetation and other debris from the interior of the building.

- Apply geotextile in the interior pinned at the corners to impede plant growth.

- Apply pea gravel on top of the fabric to improve aeration and dissipate moisture.



Figure 51. The interior floor of the shed is wet most of the year creating conditions that can cause decay and the growth of vegetation. (NPS, 2008)

BARN

Issues and Deficiencies

Site: Like other structures in the ranch yard, the barn has a history of water-related issues resulting in a continuously wet and boggy condition at the foundation and interior portions of the building. Currently, wet conditions remain a concern especially at the northwest corner of the structure. Attempts to direct water flow away from this structure using a French drain and grading to create a berm behind the structure have been minimally successful. In the past, damage from excessive moisture here has included displacement of the foundation stones that in turn caused the railroad tie walls to move and become displaced, particularly along the south elevation.



Figure 52 The Barn and collapsing chicken coop on the right. View looking north. (NPS, 2011)

Figure 53. Interior sheathing and metal roof of the barn. (NPS, 2013)



Roof: The barn roof was replaced in 2010 and is in good condition. Treatment will focus on monitoring its condition to assure potential damages from storms can be addressed as part of an annual work plan at the site.

Structural System: In 2002 preservation crews worked to repair the foundation and realigned and leveled the railroad tie walls. Based on field observation in 2013, the barn walls appear to need bracing to keep the railroad tie wall in alignment.



Figure 54. The southeast corner of the barn. Spring Box #1 in the background on the left. (NPS, 2013)

Floor: The stone footing appears stable and the dirt floor is stable but prone to dampness and moisture from encroaching water for the springs north of the building.

Chicken Coop Addition: The ruins of a wood and wire chicken coop are located on the northeast corner of the barn. This addition has been greatly damaged over the years by wet soils, encroaching vegetation, and fallen tree branches.

Treatment Recommendations

Treatment Goal

The goal for treatment of the barn is stabilization and preservation.

Site

1. Create positive drainage away from building using recommendations in Ranch Core Management Zone, "Ranch Yard, Drainage."

2. Inspect foundation and sill railroad ties annually to monitor potential damage from water, encroaching vegetation, wind, or pests and to ensure the efficacy of the site drainage solution.

3. Follow recommendation in the Ranch Core Management Zone, "Ranch Yard" section of this report for management of vegetation that may pose a threat to the barn.

Roof

2. Inspect annually to monitor for damage. Correct damage as required.



Figure 55. Illustration showing proposed shoring on the north interior wall of the barn to stabilize the structure. (NPS, 2013)

Structural System

1. Install bracing to stabilize railroad tie walls.

- Construct diagonal dimensional (1x) wood bracing on north wall.
- Monitor condition annually.

Floor

1. Inspect floors annually to detect moisture intrusion and ensure efficacy of site drainage installation.

Chicken Coop

2. Photo-document the chicken coop ruin.

3. Stabilize and selectively reestablish missing structural components of the original chicken coop to provide a representation of the historic size and character of the structure.

- Use dimensional lumber similar in size to the original material.
- Reestablish the structural frame of the brooder house. Do not reintroduce the chicken wire or any other non-extant structure.

4. Follow recommendations in the Ranch Core Management Zone, "Ranch Yard" section of this report for management of vegetation that may affect this structure.



Figure 56. Portions of the chicken coop [ruins] on the east side of the barn should be rebuilt to define the scale and extent of the historic structure for interpretative purposes. (NPS, 2012)

Treatment Goal

The goal for treatment of the ranch yard is to manage vegetation to reflect historic character.

RANCH YARD

Issues and Deficiencies

Historically, the landscape character of the ranch yard was open and maintained based on function, utility, and operations. In the absence of grazing livestock, general use, and active ranching operations, the growth of herbaceous and woody vegetation since the historic period is notable, particularly on the hillside north of the buildings. Vegetation can create a variety of maintenance issues around historic structures by increasing moisture at the foundation and damage from tree roots and overhanging limbs. Deferred maintenance can also promote conditions that favor the spread of invasive species; significantly changing the character and historic setting of the ranch.

Treatment Recommendations

1. Manage vegetation to preserve the historically open character of the ranch yard.

- Remove woody vegetation (less than 3" diameter trunk) within the boundary of the ranch yard
- Work with natural resources staff to define habitat areas and determine the extent of additional vegetation that can be removed.
- Remove all woody debris from the yard by chipping, burning in Pigeon Wash, or hauling off-site.
- Cut or mow vegetation in the ranch yard at least twice during the growing season using a mulching mower, a low-set brush hog, or a line trimmer to maintain a low, herbaceous ground cover less than 6" tall.
- Consult with natural resources staff to identify timing for mowing to ensure work occurs before seed dispersal cycles for non-native and invasive vegetation.
- Assure mulch mower or other machinery does not



Figure 57. To retain historic character, vegetation in the ranch yard between the ranch house and barn should be maintained at a relatively low profile as pictured above. View looking east (NPS, 2012).

damage the trunk or roots of mature shade trees and next generation suckers.

2. Work with fire crews and cultural resources staff to assess defensible space around historic structures and define appropriate fuel loads in the ranch yard.

- Flush-cut young trees growing within 10 feet of structures.
- Remove willow sprouts and cottonwood saplings that sprout near historic structures
- Incorporate information in the park fire management plan regarding wild land fire and appropriate fuels loads throughout Tassi Ranch and specifically within the ranch yard to assure SOPs for visitor safety, protection of historic structures, and protection of potential archeological resources.

3. Monitor and manage mature trees in the ranch yard to assure visitors safety and reduce risk to historic structures.

- Monitor mature willow and cottonwood trees annually to assess structural integrity and insect for damaged or diseased limbs.
- Pruning as needed during dormant (leaf-off) season.
- Remove deadwood, broken, or damaged limbs overhanging historic structures.



Figure 58. Panorama of the ranch yard showing Cottonwood row (left) along the fence and mature trees north of the ranch buildings providing shade and defining the setting for the historic buildings. (NPS, 2013)

- Reduce tree canopies by selective thinning to balance weight and improve structural integrity.
- Remove limbs that are overhanging the historic ranch structures.
- Remove all woody debris from the yard by chipping, moving to Pigeon Wash and burning, or hauling off-site.

YARD FENCE AND GATES

Issues and Deficiencies

In 1998, a 300-foot worm fence was constructed between the parking area and the ranch buildings to enclose and protect the structures from damage by feral cattle, burros, and grazing horses. While the fence is compatible with the character of a ranch landscape, and functions to keep animals out of the ranch yard, the design and materials are not historic or specific to other fence styles at Tassi Ranch. In addition, two new gates are needed along the length of the fence to allow access for maintenance equipment and machinery used for recurring maintenance of the ranch structures.

Treatment Recommendations

1. Repair and/or replace existing fence rails and posts as needed to maintain the fence in good condition.

2. Ensure viable access for maintenance vehicles from the entry area to the ranch yard.

Treatment Goal

The short-term goal for treatment is to maintain the current fence in good condition. The long-term goal is to re-establish a fence that is more historic in character (matching the historic panel near the stock tank).



Figure 59. Compatible but non-historic worm fence located between the parking area and the ranch yard. (NPS, 2012)

- Construct two new access gates in the same locations as the two existing gates; near the corral and adjacent to the stock tank.

- Design new gates to meet access for maintenance vehicles while ensuring the design is compatible with the historic character of the ranch.



Figure 60. The existing fence protects the historic structures from damage by feral animals. The second gate in the worm fence is shown in the photo with the movable metal panels that provide access for maintenance. (NPS, 2013)

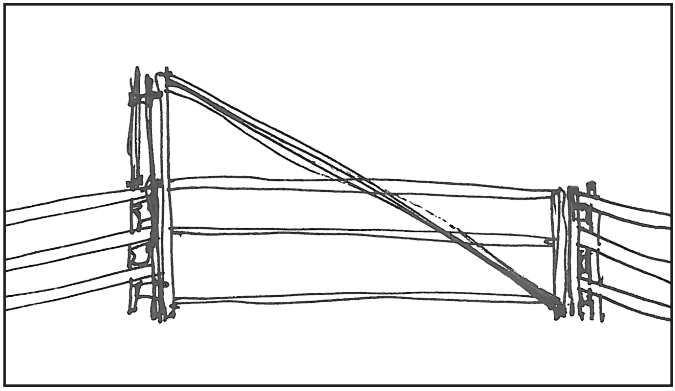


Figure 61. Conceptual design for a more compatible wood swing gate to replace the movable metal panels. (NPS, 2012)



Figure 62. Detail of corral fence post showing use of wire and other available materials for hardware and attaching members. (NPS, 2012)

CORRAL

Issues and Deficiencies

The corral is located on the east side of the ranch yard. It is constructed of salvaged lumber, railroad ties and a variety of other materials with many of the rails lashed to posts with wire. There are two gates: one on the west toward the barn and one on the south side toward the parking area. There are two additional gates within the corral. Some rails on 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. Many of the gates are not operable and in need of repair.

Treatment Recommendations

1. Complete repairs as needed to stabilize the corral fencing.

- Remove split or deteriorated posts and rails or reattaching loose rails.
- Remove and salvage sound materials for repairs.
- Replace members as needed, using in-kind materials and fastening techniques
- Monitor condition as part of annual site visits and replace any split or severely deteriorated corral posts or rails every 3-5 years as needed, following treatment recommendations.

2. Create a defensible space around the corral by clearing vegetation on both sides of the rails.

- Establish a 5-10 foot buffer on the exterior of the corral by flush-cutting woody shrubs and removing herbaceous vegetation.
- Cut vegetation to maintain buffer. Preferred time to cut is outside nesting season.

3. Coordinate with fire crews to remove woody debris by chipping, burning in Pigeon Wash, or hauling off-site.

Treatment Goal

The goal for treatment of the corral is to stabilize the wood fence and repair in kind to retain unique characteristics.



Figure 63. View of the corral looking west showing a segment of the fence that is collapsing and in need of stabilization. (NPS, 2013)

Figure 64. A wood gate with wire lashing provides access along the south side of the corral. (NPS, 2012)





Figure 65. Cottonwood row south of the ranch house provides shade and separates the ranch yard from the parking area. (NPS, 2012)

COTTONWOOD ROW

Issues and Deficiencies

The row of 9 large Cottonwood trees between the parking area and the building complex are a character-defining component of the Ranch Core and cultural landscape. The structural integrity of the trees was assessed in 2001 and based on that report, several of the trees comprising cottonwood row are at full maturity and beginning to decline. (See Appendix C) This fact, in addition to the difficulty of providing routine maintenance in such a remote location has led to the loss of structural integrity in a few trees, which in some cases, may pose risks to public safety and historic structures in the Ranch Core.

Treatment Goal

The goal for treatment of Cottonwood row is to preserve and maintain the heath and vigor of the remaining trees until failure and plan for the replacement of individual trees with root cuttings or suckers.

Treatment Recommendations

1. Maintain the 9 remaining trees in Cottonwood row.

- Work with an arborist or horticulturist to prune trees and assure structural integrity.
- Remove diseased materials or deadwood.
- Thin and reduce the size of tree canopies to balance weight and reduce wind sail effect.

- Prune during dormant season.
- Remove all woody debris from the area by chipping, burning in Pigeon Wash, or hauling off-site.
- Monitor condition of trees every 3-5 years, to remove any damaged, diseased, or dead wood.
- Assess seasonal damage as needed or practicable after storm events.

2. Remove dead or dying trees in Cottonwood row and replace with trained suckers growing at base of trees or new rooted cuttings of the same species.

- Select suckers to retain and manage.
- Preferred timing of planting is early spring.
- Supplemental water (via tree watering bag) should be supplied to newly rooted cuttings until root establishment (1-2 years).

Figure 66. Identifying and training suckers from the base of existing Cottonwood trees is a viable approach to growing replacement trees as older trees fail. (NPS, 2013)



Treatment Goal

The goal for treatment of spring box 1 is to stabilize and repair the structure to ensure viability and sustainable management of the water system.







Figure 67-69. Spring box 1 located on the hillside north of the barn, and detail (bottom) showing the condition of the mortar. (NPS, 2013)

SPRING STRUCTURES

° SPRING BOX 1

Issues and Deficiencies

Spring box 1 is located 82 feet northeast of the ranch house and directly up slope of the barn. The spring box appears to collect water from a seepage located on the hillside. However, field observations indicate that the structure does not fully capture the water seepage, and the surrounding soils are heavily saturated. French drains have been installed to drain the soils, but these systems provided only temporary or minimal success. Historically, the saturated soils were drained in an earthen ditch that conveyed ground water down slope away from the barn. Areas of mortar on the spring box are deteriorating or are in poor condition, needing re-pointing.

Treatment Recommendations

1. Clean and repair spring box 1.

- Pump water out of the basin of the spring box.
- Remove any debris and excess soil from the interior of the structure.
- Inspect out-fall pipes for any cracks, breaks, or failure points.
- Repair the out-fall to ensure a watertight seal between the box and the pipe.
- Seal the below-ground concrete [box] walls with hydraulic cement.
- Inspect and re-point the above ground stone masonry structure as needed with a matching mortar mix.

Treatment Goal

The goal for treatment of spring box 2 is to stabilize and repair the structure.

SPRING BOX 2

Issues and Deficiencies

Spring box 2 is located approximately one-quarter mile northeast of the ranch yard along Pigeon Point Road. This spring was likely used to provide water for cattle on a seasonal basis. Spring box 2 is similar in construction to Spring box 1, however it is unknown if the box was filled by a seasonal spring piped into the box or with water hauled from the Ranch Core. Currently there is no surface evidence of a pipe to supply water to the box. Park staff reports that the area is subject to a high seasonal water table, which in turn, can influence the rapid growth of vegetation around the structure.

Treatment Recommendations

1. Ensure vegetation around the spring box is cleared as needed to assure access and preservation of the structure.

- Prune and/or remove mesquite growing within 10 feet of the spring box every 1-3 years.
- Remove all woody debris from the area by chipping, burning in Pigeon Wash, or hauling off-site.

2. Inspect spring box 2 annually.

- Repair any cracks in the mortar using a compatible mortar mix.

Figure 70. Spring box 2 located east of the ranch yard along Pigeon Point Road. (NPS, 2012)



Treatment Goal

The goal for treatment of drainage in the ranch yard is to improve drainage by reestablishing a historic berm and ditch system to collect and direct water away from the historic structures.

YARD DRAINAGE

Issues and Deficiencies

Over the years, the National Park Service has used different techniques to direct runoff and seepage from the springs away from historic structures in the ranch yard. In 1999 a French drain was installed on the slope above the barn to keep the seepage from spring box 1 from saturating soils around the barn. By 2009, the out-fall from the French drain was creating an artificial expansion of the mesquite thicket south of the Ranch Core. Work was completed to extend the original out-fall further west to its current location. During this time, a second French drain was installed between the ranch house and the shed. (See Appendix B)

This system appeared to solve the problem for several years. However, during a site visit in 2011, the soils behind the barn and behind the shed were saturated and thick vegetation was present throughout the area, indicating that the French drain was no longer functioning properly. Historically, these two areas were drained using simple earthen ditches to convey the water downhill and away from structures.



Figure 71. NPS crews installing a second French drain between the ranch house and the shed. (NPS, 2009)

Treatment Recommendations

1. Repair and maintain the French drain as a viable drainage system for the Ranch Yard.

- Locate the head of the French drain pipe and clear debris in the line to assure drainage through the system.

- Inspect the French drain system annually and repair as needed to ensure that both French drain lines are clean and water can flow unimpeded.

2. Construct an earthen ditch to direct water from the area around spring box 1 away from the barn.

- Locate the ditch approximately 10-15 feet southwest of spring box 1, and align it roughly southeast, ending at the area between the chicken coop and the corral.

- Excavate a ditch approximately 18-24 inch wide and 18-24 inches deep. Ensure that the ditch has sufficient slope to convey water downhill for the entire distance of the ditch.

- Inspect the ditch biannually and repair to ensure that the berm is stable, and is clear of woody vegetation and debris, allowing water to flow.



Figure 72. View from spring box 1 looking southeast, showing the approximate alignment of a new earthen ditch designed to collect and drain seepage behind the barn. (NPS, 2013)

3. Construct an open ditch to drain ground water away from the shed.

- Locate the ditch approximately 15-20 feet up hill of the shed, and align the ditch roughly southwest, ending in an area approximately 30-40 feet west of the shed.

- Excavate a ditch approximately 18-24 inch wide and 18-24 inches deep. Ensure that the ditch has sufficient slope to convey water downhill for the entire distance of the ditch.

- Inspect the ditch biannually and maintain to ensure that the structure is stable, and is clear of vegetation and debris.

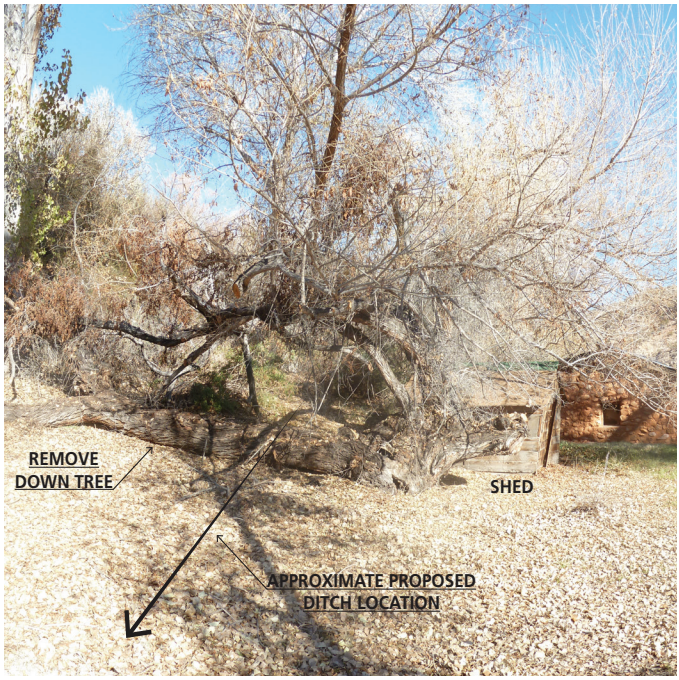


Figure 73. View from the ranch yard looking northeast towards the shed, showing the proposed location and alignment for a new drainage ditch behind the Ssed. (NPS, 2013)

Treatment Goal

The goal for treatment of the stock tank is to eliminate the flow of water to the tank and retain the tank for interpretation.

STOCK TANK

Issue and Deficiencies

The stock tank is located along the ranch yard fence, south of the ranch house. The stock tank was installed in the 1990s to provide water for cattle. Water flows into the tank through a rubber hose connected to a spring head above the ranch yard. Until recently, the volume of water flowing through the tank was strong enough to flush debris out of the tank. The water leaves the tank in another pipe system leading south into the nearby mesquite thicket. Evidence of a small seep or leak in the tank indicates some water is draining directly into the ground.

Recent investigations by the park to locate and clear the hose have not proven successful. It is possible that water is leaking from the hose and adding to the saturated soils around the shed. Since the water no longer flows from the tank, it tends to fill with debris and stagnate.

Treatment Recommendations

1. Bury any exposed sections of the hose so it does not create a tripping hazard.

2. Create a hole in the base of the stock tank to ensure that it drains completely, and does not attract mosquitoes.

3. Work with natural resources staff to ensure the timing and repairs will maintain relict leopard frog habitat.



Figure 74. The stock tank located along the ranch yard fence at the base of a large Cottonwood row. ((NPS, 2013)



Figure 75. A hydraulic hose was used to convey water from the spring to the stock tank. (NPS, 2013)

Road and Irrigation Ditches

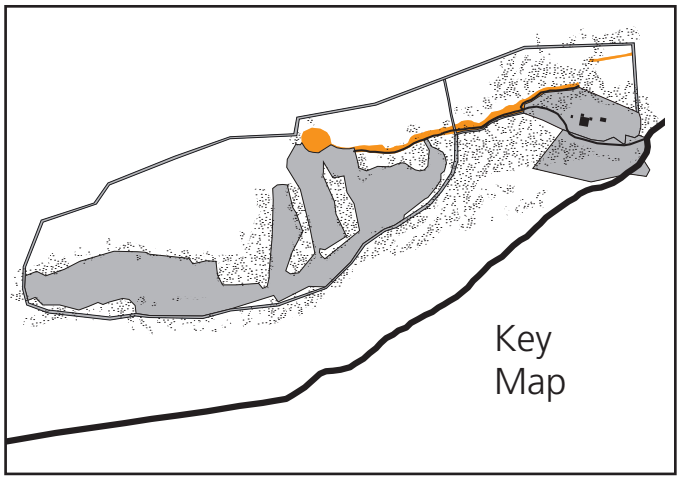
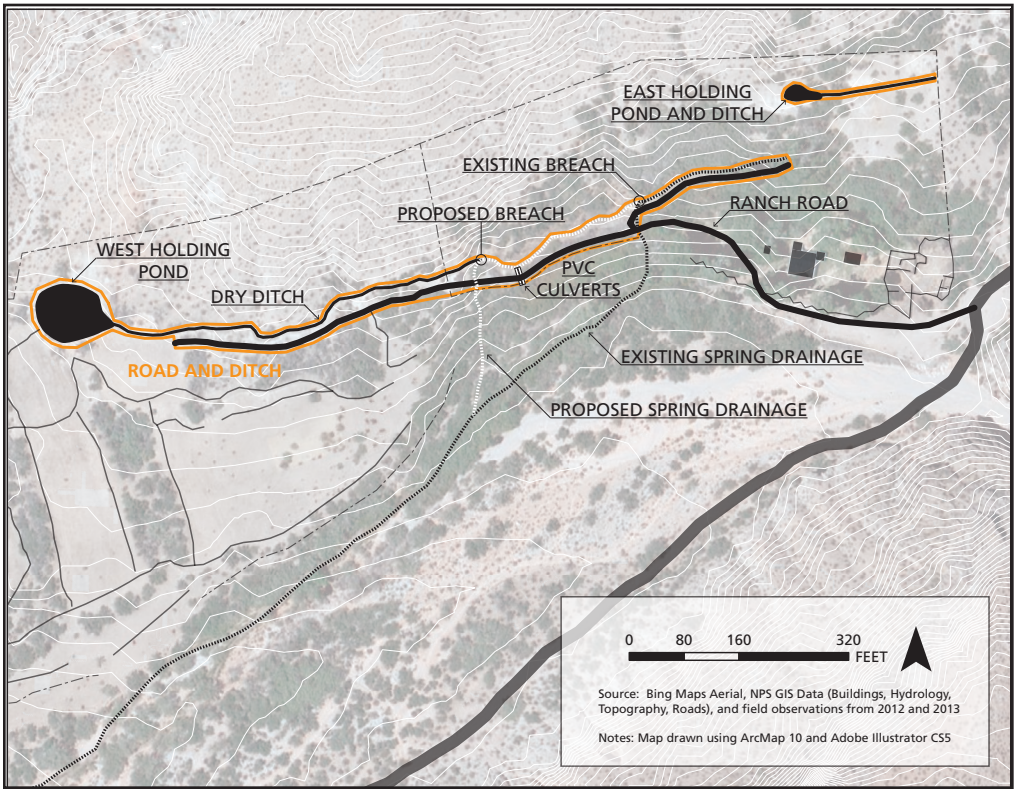


Figure 76. Illustration of proposed treatment recommendations for the Road and Irrigation Ditches Management Zone, Tassi Ranch. (NPS, 2013)



Treatment Goal

The goal for treatment of the ranch road is to preserve the historic two-track by clearing vegetation from the corridor and repairing the breach to stabilize the road prism.



Figures 77. Encroaching vegetation along the ranch road has reduced several areas of the historic road to a single track trail. (NPS, 2011)

Figure 78. View of the ranch road showing the large brush piles that need to be removed to create a 8-10 foot clear zone. View looking west. (NPS, 2013)



RANCH ROAD

Issues and Deficiencies

The Tassi Ranch Road is a two-track utility road that leads from the ranch yard to the upper springs, where it turns west along the irrigation ditch toward the ranch fields. Historically this road provided vehicular access to manage and maintain the irrigation ditches, including the holding pond, and lateral ditch system through the fields. It is likely that during the historic period this road was also a primary route for moving livestock between the fields and the corral. Today, much of the original ranch road is overgrown with vegetation, and is not passable. In addition, a major breach in the functioning portion of the irrigation ditch has created a significant and continuous flow of water across the road, causing erosion of the road prism. The road is also truncated by a post and wire fence built by the NPS to prevent cattle from roaming into the ranch yard. A stile provides pedestrian access over the fence. Collectively, these issues limit access along the road for maintenance vehicles, visitor interpretation, and general public access to the full extent of ranch resources.

Treatment Recommendations

1. Remove all existing brush piles along the road and irrigation ditch corridor by chipping, burning in Pigeon Wash, or hauling off-site.

2. Remove overgrown vegetation on both sides of the ranch road.

- Establish an 8-10 feet clear zone on each side of the road using a brush hog, brush blade, and other mechanisms as needed.
- Remove all woody debris from the road prism by chipping, burning in Pigeon Wash, or hauling off-site.
- Work with natural resources staff to assure vegetation removal occurs outside of nesting season.

- Repair irrigation ditch and construct new breach.

3. Stabilize the existing cut terrace for the road bed as needed.

4. Remove the PVC culverts at the existing ditch breach.

- Re-grade portions of the road bed eroded by the irrigation channel breach.

- Use gravel or excavation material from dry ditch to backfill eroded areas and compact to achieve a stable roadbed for maintenance and other vehicles.

- Monitor condition every 3-5 years and stabilize as needed.



Figure 79. The current breach in the irrigation ditch across the ranch road, constructed with two PVC culverts. Wash from the out-flow of the pipes has eroded the bank and will require repair and stabilization after the new breach is constructed. (NPS, 2013).

Treatment Goal

The goals for treatment of the functioning irrigation ditch are 1) to repair the functional ditch and extend it west to a new breach location; 2) increase the length of the historic channel; 3) repair slope erosion at the current breach; and 4) create additional habitat for known aquatic species.

FUNCTIONING IRRIGATION DITCH

Issues and Deficiencies

Historically an earthen irrigation ditch collected water from a series of spring heads clustered on the hillside north of the ranch yard. The irrigation ditch followed the contours of the hillside, just above the ranch road, and carried water from the springs to a holding pond above the ranch fields. From there, the water flowed in a series of lateral and cross ditches to irrigate the fields and pasture area for grazing cattle.

Approximately 230 feet of the historic ditch still carries water from the springs to a point where a breach in the ditch is located. This segment of the historic ditch is overgrown with herbaceous and woody vegetation that has clogged the ditch and damaged the earthen walls of the channel. At the current breach, the water leaves the ditch, flows across the road, then runs downhill into a Mesquite thicket on its way to Pigeon Wash. This in turn, has created areas of erosion along the road track, and on the hillside below the road terrace.

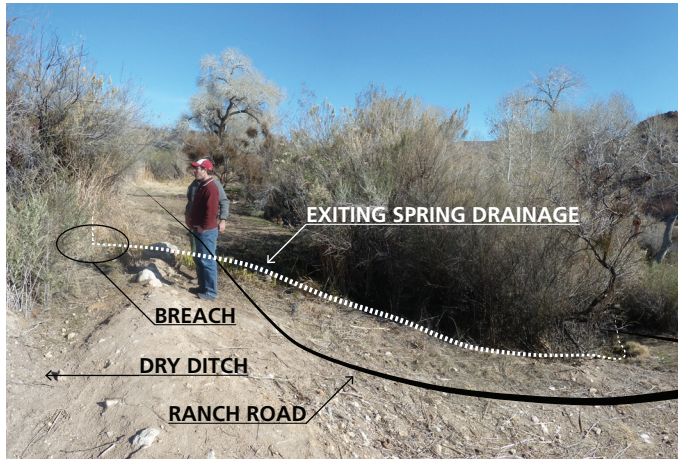
Treatment Recommendations

1. Re-contour the segment of dry ditch between the existing breach and the proposed breach using a small excavator or back hoe.

- Excavate ditch to create a 1-3 ft. wide, flat-bottom ditch, with variable depth.
- Grade running slope of ditch bottom with minimum 1 percent slope, to allow positive flow west from the springs along the hillside.
- Use excavated material for ditch wall and compact to achieve a stable berm (to retain water).

2. Excavate a shallow channel to create a new "controlled breach" for the irrigation ditch by excavating a shallow channel at the proposed location.

Figure 80. View of the existing breach across the road. View looking east. (NPS, 2013)



- Contour the 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.

- Design the reconstructed irrigation channel [shallow enough] to allow maintenance vehicles access to the ranch fields.

3. Remove vegetation from the ditch using a weed hog, trimmer blade, or brush blade.

- Protect habitat by clearing vegetation from only one-third of the ditch annually, starting at the existing breach.

- Flush cut all herbaceous and woody vegetation growing in the ditch and on the ditch wall. Clear vegetation to 5 feet up the ditch back slope.

- Remove all woody debris from the area by chipping, burning in Pigeon Wash, or hauling off-site.

4. Re-contour the brushed ditch using a small excavator or back 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 percent slope, reflecting historic character of the ditch profile along the terrace.

- Place excavated material on ditch wall and compact wall material to stabilize berm and retain water.

- Phase work to re-contour one-third of the ditch allowing viable flow from the springs west to the location of the new breach.

5. Establish trees or shrubs on the north side of the functioning irrigation ditch to provide shade and enhance conditions that support the spring snail habitat.

- Work with natural resources to assure all work is preformed outside amphibian spawning season.



Figure 81. View of the functioning ditch in the area near the spring, showing the thick growth of vegetation choking the channel. (NPS, 2011)



Figure 82. Section of the functioning irrigation ditch that has been cleared of vegetation. (NPS, 2011)

DRY IRRIGATION DITCHES & HOLDING PONDS

Treatment Goal

The goals for treatment of the dry irrigation ditch and holding ponds are to stabilize and preserve the form and profile of the landforms as non-functioning historic features and interpret them as components of the larger historic water system at Tassi Ranch

Issues and Deficiencies

The abandoned and non-functioning portion of the historic irrigation ditch extends from the existing breach, west approximately 840 feet. This ditch historically conveyed spring water along the hillside into the west holding pond. The holding pond remains today and is roughly ninety feet across. Two additional dry ditches remain on the south and west sides of the holding pond, where they branch into several lateral ditches running down slope onto the ranch fields. A collapsed culvert remains on the south side of the holding pond. Portions of the dry ditch and holding pond show evidence of damage from rodent burrows contributing to other erosion occurring the channel.

A second, smaller holding pond—the east holding pond, is located in a pasture area above the ranch house. Roughly pear-shaped in configuration, and is approximately sixteen feet in diameter with only one visible dry ditch feeder that enters the pond from the east. Little documentation is available about this structure but it likely was used to hold water for grazing cattle.

Treatment Recommendations

1. Remove vegetation from the existing dry irrigation ditches and holding ponds using a weed hog trimmer blade or brush blade (such as a “beaver blade”).

Flush cut all herbaceous and woody vegetation growing in the ditches and holding ponds, including the walls, and to 5 feet up the back slope.



Figure 83. View of the west holding pond from the dam, looking east towards the Ranch Core. (NPS, 2012)

Remove all woody debris from the area by chipping, burning in Pigeon Wash, or hauling off-site.

2. Manage vegetation within dry ditches and holding ponds.

- Cut vegetation two times annually during the growing season using a line trimmer to maintain a low, herbaceous ground cover less than 6" tall.

- Consult natural resources staff and/or exotic plant management team on timing of work, in order to ensure cutting before seeding and dispersal of invasive vegetation.



Figure 84. A segment of the dry irrigation ditch where vegetation has colonized, obscuring the profile of the original ditch. (NPS, 2011)



Figure 85. The western portion of the dry ditch has far less vegetation and retains much of the historic character and structural integrity of the historic ditch. (NPS, 2012)

Ranch Fields

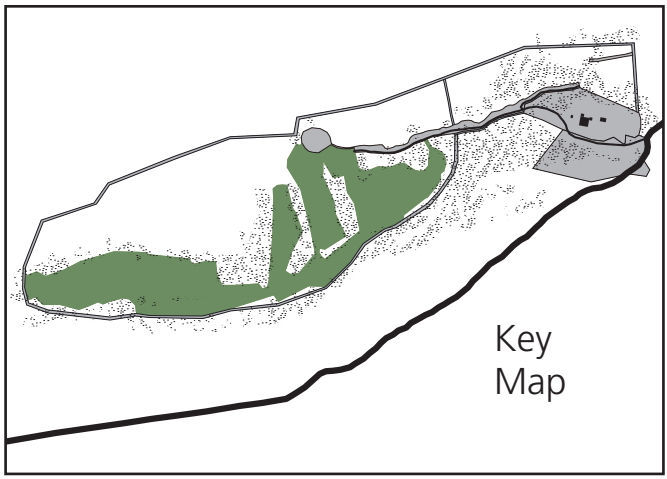
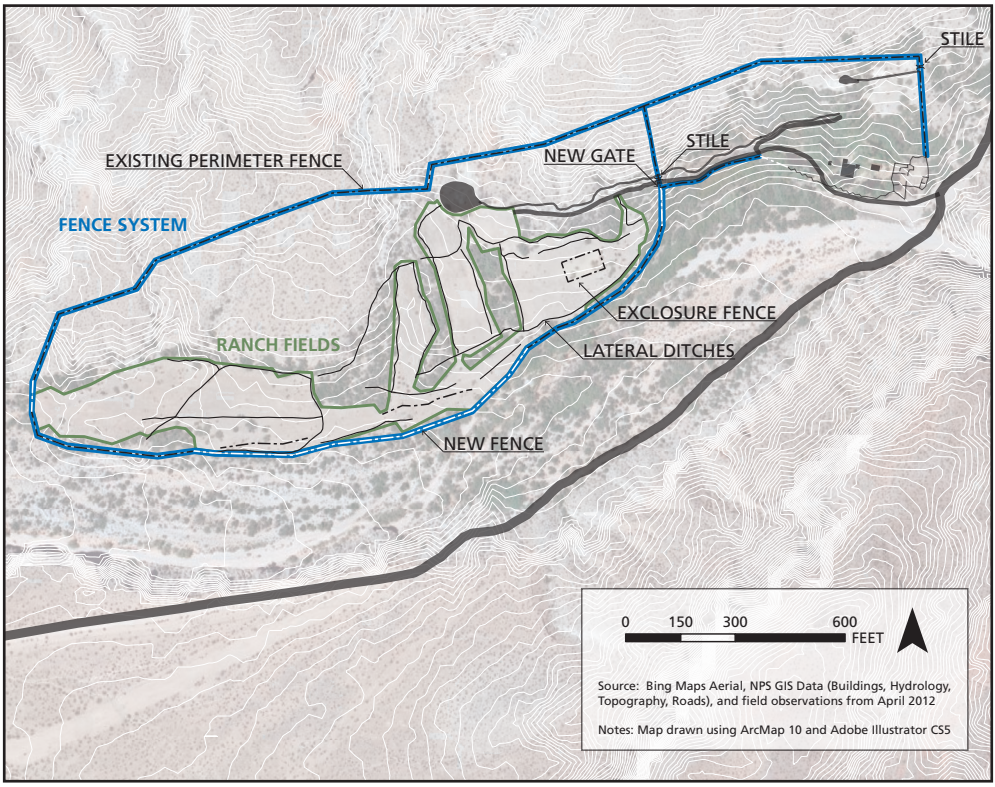


Figure 86. Illustration of proposed treatment recommendations for the Ranch Fields Management Zone, Tassi Ranch**.** (NPS, 2013)



Treatment Goal

The goal for treatment of the historic ranch fields is to reduce the encroachment of woody vegetation and maintain an open character.

RANCH FIELDS

Issues and Deficiencies

Ranch fields maintained during the historic period are situated on a sweeping east-west trending slope between Pigeon Wash and ranch road. Documentation suggests that fields were cleared of woody vegetation and large stones prior to the construction of the hand-dug irrigation ditches used to water the fields. Small flood gates and lateral ditches were part of a gravity fed irrigation system, where water was channeled from the holding pond onto the fields supporting vegetation for grazing livestock. Today, an extensive network of furrows and remnant ditches remain in the upper portions of the fields, but in the lower reaches, woody vegetation is encroaching from perimeter areas into the historically open areas of all the fields.

In addition, an animal exclosure in the southeast field, erected in 1993, has effected a notable change in the historic character of the fields. In addition to the intrusion of the structure itself, non-native and invasive species are growing within the exclosure and in the absence of an active monitoring program; the exclosure itself is having an adverse impact on the historic setting and physical character of the open field.

Treatment Recommendations

1. Flush-cut woody vegetation less than 3" in trunk diameter, growing within and along the perimeter of the ranch fields.

- Remove all woody debris from the area by chipping, burning in Pigeon Wash, or hauling off-site.

- Conduct all plant removal outside of nesting season.

2. Work with natural resources staff to remove exclosure fence.

- Remove woody and invasive vegetation growing within the exclosure.

- Remove all woody debris from the area by chipping, burning in Pigeon Wash, or hauling off-site. Herbaceous vegetation can be left in place as a mulch.

- Consult natural resources staff and/or Exotic Plant Management Team to ensure removal occurs prior to natural seeding and dispersal of invasive vegetation.

Figure 87. View of the ranch fields from the ridge south of Pigeon Wash (foreground) View looking northeast. (NPS, 2012)





Figure 88. View of easternmost ranch field looking southwest from the ranch road near the Ranch Core. (NPS, 2012)

Fence System

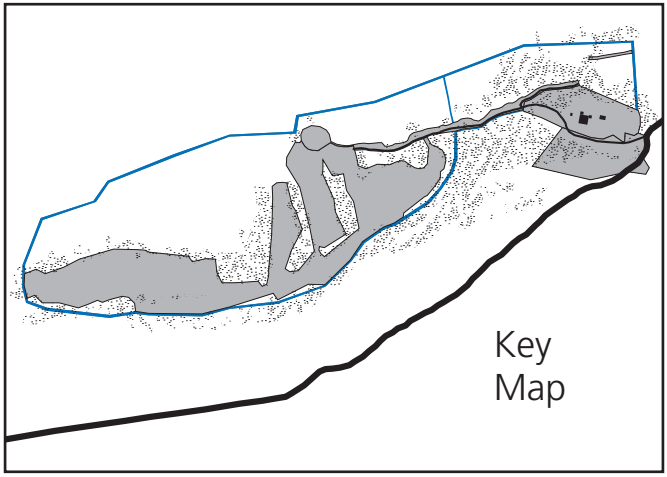
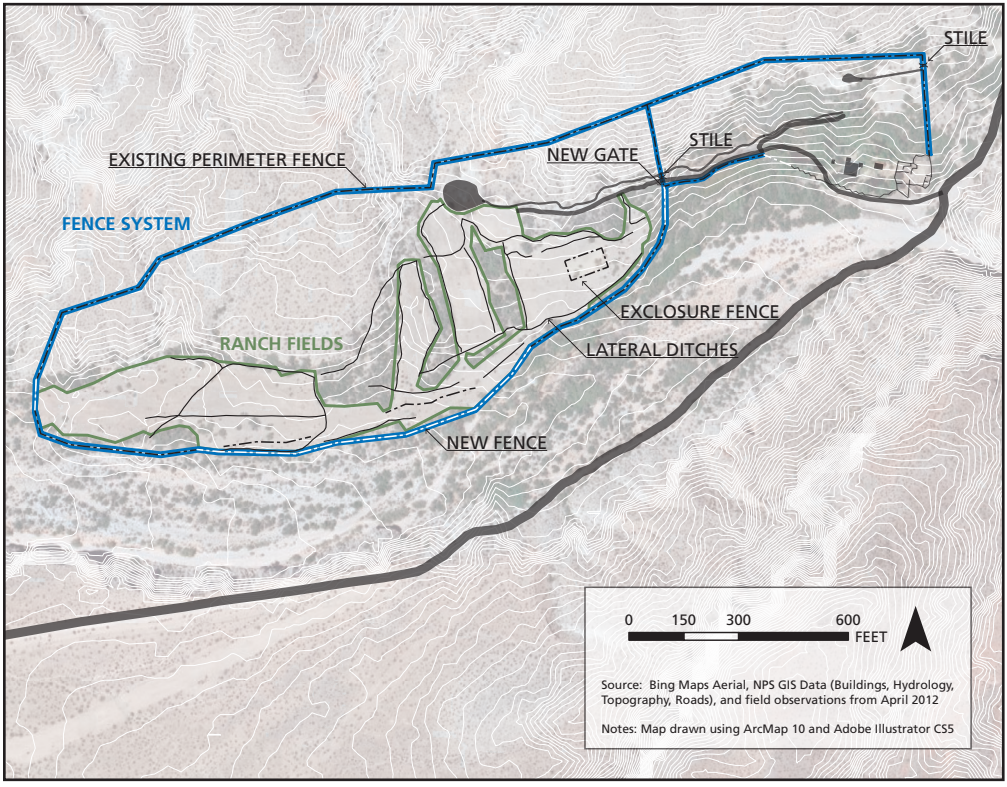


Figure 89. Illustration of treatment recommendations for the Fence System Management Zones,Tassi Ranch**.** (NPS, 2013)



CORE PROTECTION FENCE

Issues and Deficiencies

The core protection fence encloses approximately five acres of the Ranch Core. It is a 3-strand barbed wire fence with a combination of metal and local wood fence posts. The fence begins at the ranch yard and follows the south side of the ranch road approximately 290 feet before turning north and then east across the slope above the springs and upper pasture, to a point where it turns south, to meet the corral fence. The accessible [visible] portions of the fence are in generally good condition. There are areas where damage from feral livestock is evident and there is one area west of the ranch yard where two large trees have fallen over the fence and demolished it creating a break. Two stiles—one located along the ranch road where the fence turns north, and the other above the corrals, allow pedestrian access to the over the fence. There are no gates or openings for vehicles.

Treatment Goal

The goal for treatment of the core protection fence is to stabilize and repair the fence as needed, to prevent feral livestock from entering the Ranch Core.



Figure 90. The core protection fence north of the stile is in good condition.(NPS, 2011)

Treatment Recommendations

1. Repair and construct new portions of the core protection fence to re-establish a viable and complete enclosure.

- Reset leaning posts
- Replace deteriorated posts in-kind
- Tighten or re-stranding 3-strand barbed wire as needed to assure viable structure
- Re-use existing components where possible and retain the when component replacement is needed.
- Ensure new sections of fence are visually and physically compatible with the existing fence in terms of design, form, materials, and methods of construction.

2. Create a new vehicular access gate along ranch road to allow park maintenance vehicles access from the entry and ranch yard, west to the ranch fields.

- Design of the gate should be simple and compatible with the design and materials of the fence.
- Relocate existing stile next to new gate to permit pedestrian access when gate is locked.



Figure 91. A stile along the road provides pedestrian access while restricting feral livestock and cattle from the Ranch Core. (NPS, 2012)

PERIMETER FENCE

Treatment Goal

The goal for treatment of the perimeter fence is to stabilize and repair the fence sections using materials that are compatible with the character of the historic fence.

Issues and Deficiencies

The Tassi Ranch perimeter fence starts at the northeast corner of the core protection fence and extends west along the slope of the hillside to the western most ranch field. The fence wraps around the west side of the field before turning east generally following the north side of Pigeon Wash and the south boundary of the cultural landscape, ending at the southwestern corner of the core protection fence. The ranch perimeter fence historically defined the main enclosure for grazing cattle in the fields and dry pastures above the fields.

Today, portions of this fence are similar in material and construction style to the ranch core protection fence, but the perimeter fence also has significant losses, gaps, and missing sections, as well as several areas where there is evidence of animal damage and degradation especially along the south run. In some cases, especially around Pigeon Wash, original materials—such as wood fence posts, remain near damaged areas.

Treatment Recommendations

1. Stabilize and maintain existing fence segments.

2. Repair extant ranch perimeter fence along the north side of Pigeon Wash. Existing materials should be salvaged and re-used to the extent possible

- Reset existing posts that are leaning or near failure
- Re-strand and/or tighten wire as appropriate
- For wood posts use juniper and/or mesquite
- Use barbed wire stringers.

3. Repair historic fence on the east side and north side of the field areas to ensure that the fence is viable and can keep feral livestock out of the ranch area.

- Salvage structurally sound materials for repairs whenever possible.

- Repair the fence using in kind materials.
    - Use juniper and/or mesquite for fence posts
    - Use barbed wire stringers.

4. Construct new segments of fence to fill-in missing sections of perimeter fence

- Use materials that are compatible with the character of the existing fence (adjacent to the new fence line).



Figure 92. Northwest section of the perimeter fence in poor condition and in need of repair. (NPS, 2011)

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Appendices

Appendix A: Secretary of the Interior Standards for Preservation and Rehabilitation

Appendix B: French Drain Documentation

Appendix C: Arborist Report

Appendix D: As Built Floor Plans, 2003

APPENDIX A: Secretary of the Interior's Standards

Preservation *is defined as the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.*

Preservation Standards

1. A property will be used as it was historically, or be given a new use that maximizes the retention of distinctive materials, features, spaces, and spatial relationships. Where a treatment and use have not been identified, a property will be protected and, if necessary, stabilized until additional work may be undertaken.

2. The historic character of a property will be retained and preserved. The replacement of intact or repairable historic materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.

3. Each property will be recognized as a physical record of its time, place, and use. Work needed to stabilize, consolidate, and conserve existing historic materials and features will be physically and visually compatible, identifiable upon close inspection, and properly documented for future research.

4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.

6. The existing condition of historic features will be evaluated to determine the appropriate level of intervention needed. Where the severity of deterioration requires repair or limited replacement of a distinctive feature, the new material will match the old in composition, design, color, and texture.

7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.

8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

In ***Rehabilitation***, historic materials and character-defining features are protected and maintained; however, if existing historic fabric has become damaged or deteriorated over time more repair and replacement will be required. Thus, latitude is given in the Standards for Rehabilitation to replace extensively deteriorated, damaged, or missing features using either traditional or substitute materials.

Rehabilitation Standards

1. A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.

2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.

3. Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.

4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.

6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.

7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.

8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.

10. New additions and adjacent or related new construction will be undertaken in a such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

APPENDIX B: French Drain Documentation

Tassi Ranch Project 2009

Project consisted of:

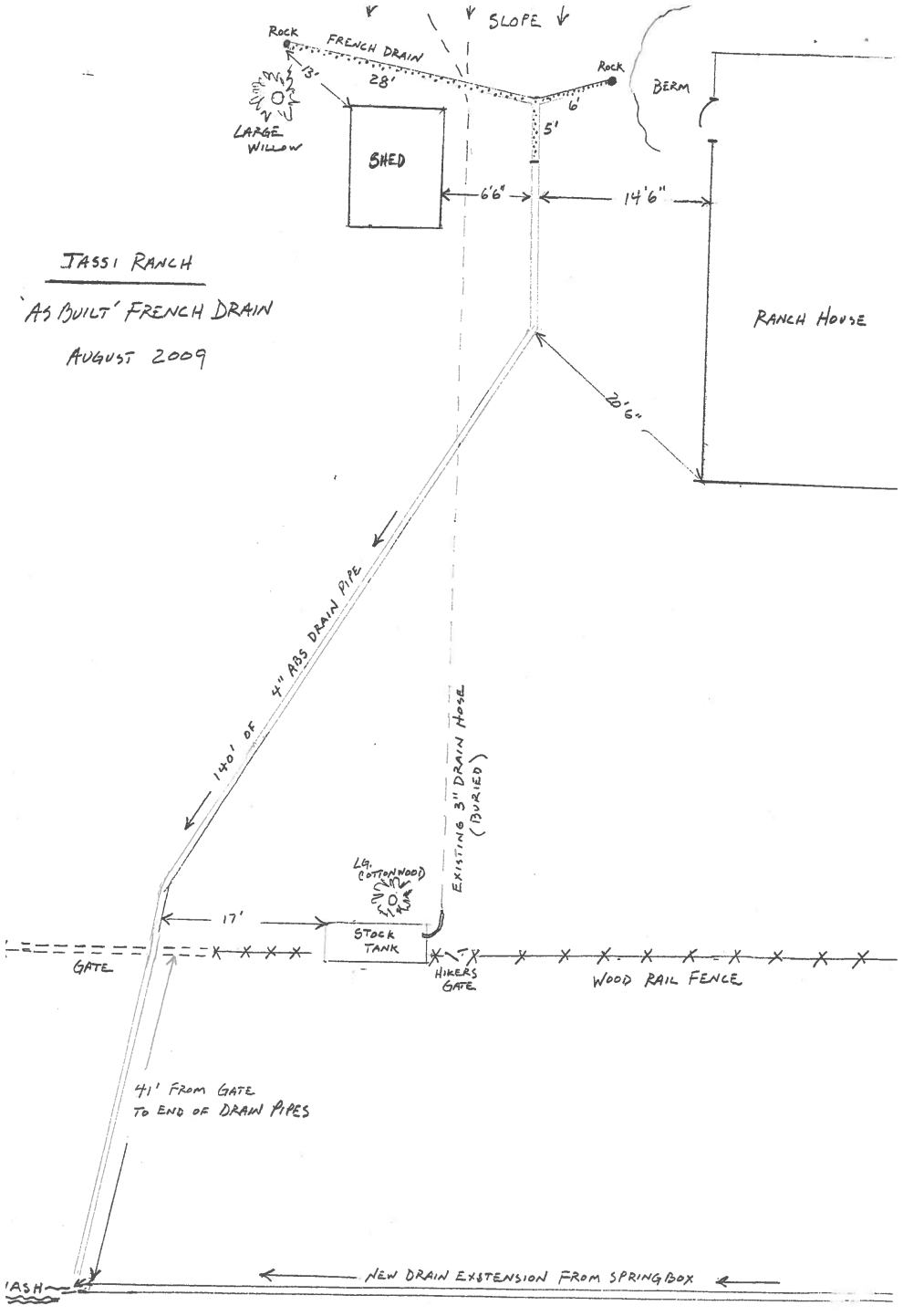
1. Redirecting and extending an existing 4" ABS drain pipe in efforts to restore historic view from ranch house.
2. Stabilizing west wall of barn.
3. Stabilizing and replacing barn roof.
4. Installing a new French drain behind flooded shed west of the ranch house.
5. Repointing stone work on ranch house.

1. Located end of existing 4" ABC drain; cleaned roots out of pipe; connected 90 degree bend and cleanout/box. Ran new 4" ABS pipe 122' to the west ending small dry wash (see as built diagram and photos for details).
2. West wall of barn had sunk, probably due to earlier flooding (10 or more years ago). Braced and jacked up wall, excavated and planted large stones under sill logs. Realigned and shimmed wall logs in efforts to retighten walls and corners. Filled in gaps of foundation with smaller stones to match original.
3. Removed old metal roofing panels. Re-nailed old rafters where needed and added a few new ones in order to strengthen roof and improve safety prior to working on roof top. Scribed and attached blocking to ridge beam in order to support upper ends of all rafters. Removed majority of old rotted wood roof decking (purlins). Replaced with 1"X 8" rough sawn fir. Stamped all new lumber with "NPS Restoration 2009". Installed new corrugated roofing panels and ridge cap.
4. Installed 12"X 12"X 40' of French drain behind shed on west side of ranch house in attempts to dry out and save shed. Dug 12" X 12" X 40' ditch using backhoe; added 4" of ¾" gravel, layed 4" perforated drain pipe with fabric sock; finished filling ditch with gravel and toped off with 1 to 2 inches of soil. Dug trench for 4" ABS drain line 12" to 18" deep by 140' long. Connected 4" ABS drain pipe to perforated and ran out to small wash (see as built diagram and photos for details).
5. Re-pointing stone ranch house with adobe mortar phase of project will continue when weather cools down to prevent cracking.

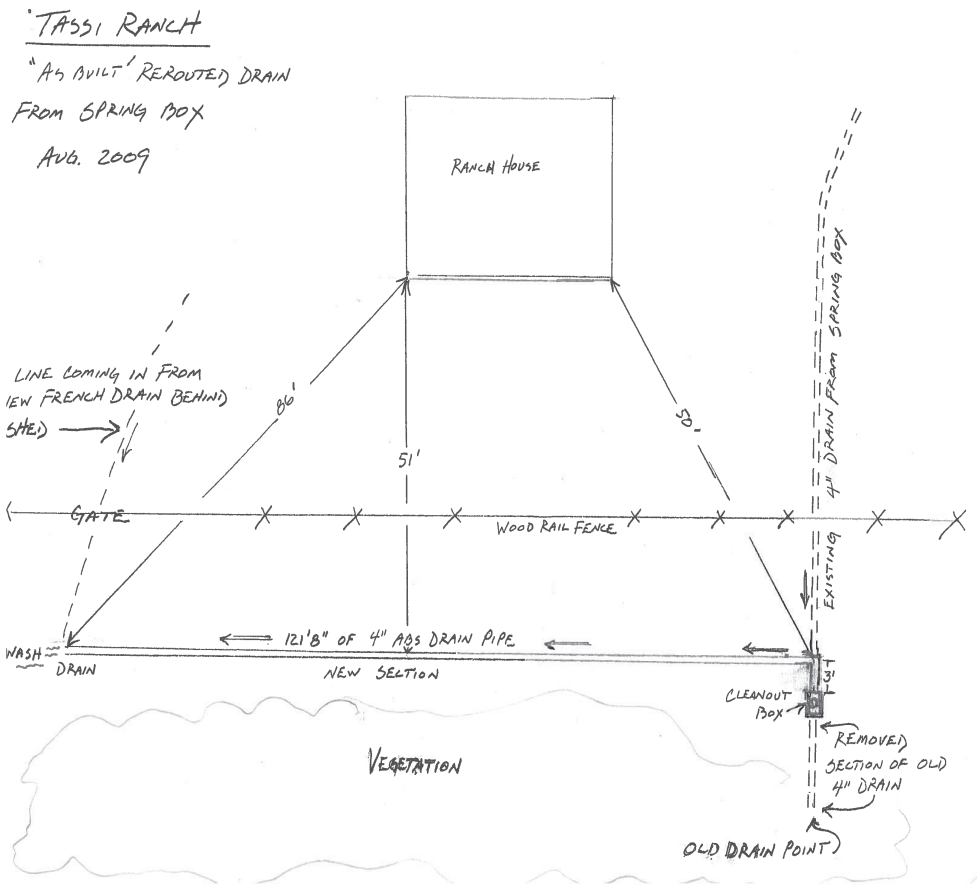
Work performed by Jim Hancock and Terry Shaver
August 24, 2009







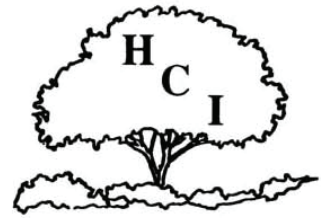
Tassi Ranch, 'as built' French Drain, August 2009.



Tassi Ranch, 'As Built' Rerouted Drain From Spring Box, Aug. 2009.

APPENDIX C: Arborist Report, 2001

HORTICULTURE CONSULTANTS, INC.
3838 Raymert
Las Vegas, Nevada 89121
Telephone (702) 456-7776



October 12, 2001

Ms. Rosie Pepito
National Park Service
601 Nevada Highway
Boulder City NV 89005

Dear Ms. Pepito:

At your request, I have conducted an inspection of the large specimen trees located on the Tassi Ranch site. This inspection was conducted on October 9, 2001. The purpose of the inspection was to ascertain the health and condition of these historical trees and to document the potential hazard that these trees might pose in the event of failure.

OBSERVATIONS

The majority of the trees were characterized as mature specimens approaching a state of senescence. There were two species present, including the native western or Fremont cottonwood, *Populus fremontii* and the Gooding's willow, *Salix goodingii*. It was stated that these trees were thought to be approximately eighty years of age. Only two of the specimens were characterized as young and vigorous. These trees are either suckers of roots or seedlings from the mature cottonwood trees.

Both species are considered to be short-lived, fast growing trees. Some specimens may be long lived in natural conditions, but most succumb to prevalent insect and disease problems. Cottonwoods are susceptible to several disease problems including bacterial crown gall and slime flux diseases as well as fungal disorders known as sooty canker and cytospera. Both of the species are subject to borer insect attack and are considered brittle-wooded and prone to limb failure.

Essentially these trees have been left to their own defenses and have received no corrective pruning. Many of the specimens have had large limb failures, have limbs hanging in the tree and have the presence of animal intrusion in the trunks. Some of the specimens are also showing signs of advanced wood decay, with fungal conks present at the soil line. It seemed pointless to create additional wounds by penetrating the wood with an increment borer to determine internal decay, but one specimen was sampled. There was evidence of internal wet wood indicating that bacterial organisms were present within the trunk of the cored tree.

ANALYSIS AND RECOMMENDATIONS

The following specimens are identified numerically and match the attached diagram.

1. *Populus fremontii*, western cottonwood. Percent alive: 70%. This tree poses an extreme hazard. It is inflicted with basal crown gall with deep cavities of infection. It has a heavy lean to the east, creating a hazard to the corral area. While it would be possible to trim this to develop a safer canopy, and due to the nature of the cavities in the basal area it would be highly recommend to reduce the tree to a large stump so that it could be utilized as a wildlife tree.
2. *Populus fremontii*, western cottonwood. Percent alive: 60%. This tree poses a moderate hazard. It shows evidence of major limb failure. There are numerous hangers (branches broken off and hanging in the tree). There is evidence of aerial crown gall. It would be difficult to develop recommendations for this tree from the vantage point at ground level. I would recommend that all hangers should be removed, dead-wood the tree and asses condition for hazard from an aerial vantage point. The tree trimmer would be able to determine if this tree should be reduced to a wildlife tree or not.
3. *Populus fremontii*, western cottonwood. Percent alive: 85%. This tree poses a nominal hazard. There has been minor limb failure, nominal hangers and possible trunk cavity development. I would recommend dead-wooding the tree and the removal of all hangers. Monitor condition.
4. *Populus fremontii*, western cottonwood. Percent alive: 30%. This tree is a moderate hazard. It has had major limb failure and there are moderate hangers in the canopy. There is evidence of internal cavity development. I would recommend that all hangers be removed and that the tree be reduced to a wildlife tree due to internal decay and major limb deterioration. Once the tree is removed or dies, there is a potential for subsidence under the foundation of the ranch house structure due to the eventual decay of roots that may have spread under the dwelling.
5. *Populus fremontii*, western cottonwood. Percent alive: 75%. This tree poses a nominal hazard. There is evidence of minor limb failure and minor hangers. There is evidence of bacterial slime flux. I would recommend that the tree be dead-wooded and monitored for future health.
6. *Populus fremontii*, western cottonwood. Percent alive: 75%. This tree poses a nominal hazard. There is evidence of bacterial slime flux. There are moderate hangers and possible cavities. I would recommend the removal of dead-wood and hangers in this tree.

Page Three
National Park Service
October 12, 2001

7. *Populus fremontii*, western cottonwood. Percent alive: 60%. This tree poses a moderate hazard. It has moderate limb failure and has significant fire or lightning damage to the trunk resulting in major bark damage. There is conk development along the base of the tree and the trunk. There is evidence of potential cavities. There is a significant lean to the west. Due to the size and nature of injuries to this tree, I would recommend that the canopy should be reduced to a safe size for the site or reduced to a wildlife tree.
8. *Populus fremontii*, western cottonwood. Percent alive: 40%. This tree poses a moderate hazard. It has had major limb failure and has been affected by fire or lightning. There is major bark failure. There is a significant lean to the east. This tree should be reduced to a wildlife tree.
9. *Populus fremontii*, western cottonwood. Percent alive: 30%. This tree poses a major hazard. It has significant die-back and hangers. It should be reduced to a wildlife tree.
10. *Populus fremontii*, western cottonwood. Percent alive: 60%. This is a very large specimen. It poses a moderate hazard. There is moderate limb failure. I would recommend the removal of dead-wood and monitor for health.
11. *Populus fremontii*, western cottonwood. Percent alive: 90%. This tree is a nominal hazard. There is minimal die-back and no evidence of disease present. I would recommend the removal of dead-wood only.
12. *Salix goodingii*, Gooding's willow. Percent alive: 60 %. This tree poses a moderate hazard. This tree has a widespread canopy with a critical split in the trunk. There is evidence of crown gall and conks present. Although the trunk split is significant, the majority of the tree is parallel to the ground. There is minimal danger of human or property damage.
13. *Populus fremontii*, western cottonwood. Percent alive: 100%. This tree is a possible sucker from an adjacent tree. It is in excellent health and requires no action.
14. *Populus fremontii*, western cottonwood. Percent alive: 95%. This tree is a good specimen. There is a slight possibility of slime flux. No action required.
15. *Populus fremontii*, western cottonwood. Percent alive: 95%. There is some evidence of crown gall. This tree is in good health and requires no action.
16. *Populus fremontii*, western cottonwood. Percent alive: 95%. This is actually a stand of several trees that are in good health and require no action.
17. *Salix goodingii*, Gooding's willow. Percent alive: 85%. This tree is in decent shape and requires no immediate action.
18. *Populus fremontii*, western cottonwood. Percent alive: 85%. This tree poses a moderate hazard. It has nominal hangers. It requires the removal of dead-wood and hangers.

Page Four
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October 12, 2001

CONCLUSIONS

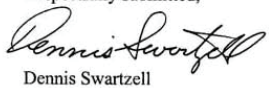
This is a classic situation of stately specimens of native species that have declined significantly to the point of posing a hazard to property and life. From a liability standpoint these trees require considerable trimming to reduce the hazard potential. Unfortunately cottonwood trees do not respond well to significant reduction in canopy and the typical response is continued die-back and decay development. This response will most likely lead to the premature death of a number of these species.

I would recommend that these trees should be monitored on at least an annual basis to ascertain the extent of die-back and the requirement for pruning. Some of the trees in poor health may be developed into what I have termed as wildlife trees. This would entail the removal of all large, deteriorated scaffold branches back to the main trunk, perhaps leaving any living branches that might keep a portion of the trunk alive. While this does not leave the tree much dignity (and I believe that trees should have dignity) it would provide habitat for large birds and assorted other creatures that might be able to use a hollow trunk.

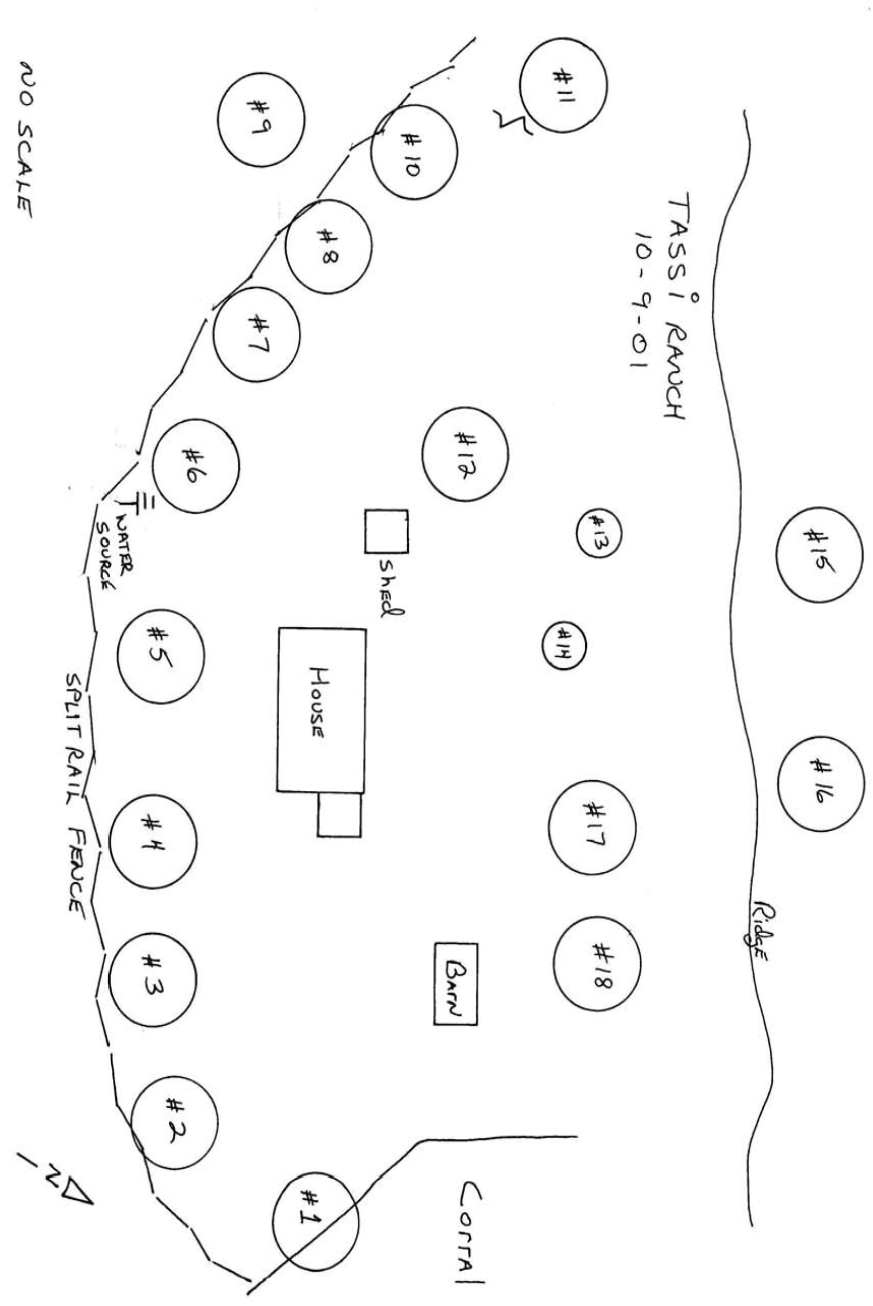
I would propose that additional trees of the same species or other indigenous species should be planted to restore the tree canopy around the ranch. While it is unfortunate that some of the older specimens are in decline, with time a new generation may be developed for the site.

Please call if you have any questions or if I may help in any way.

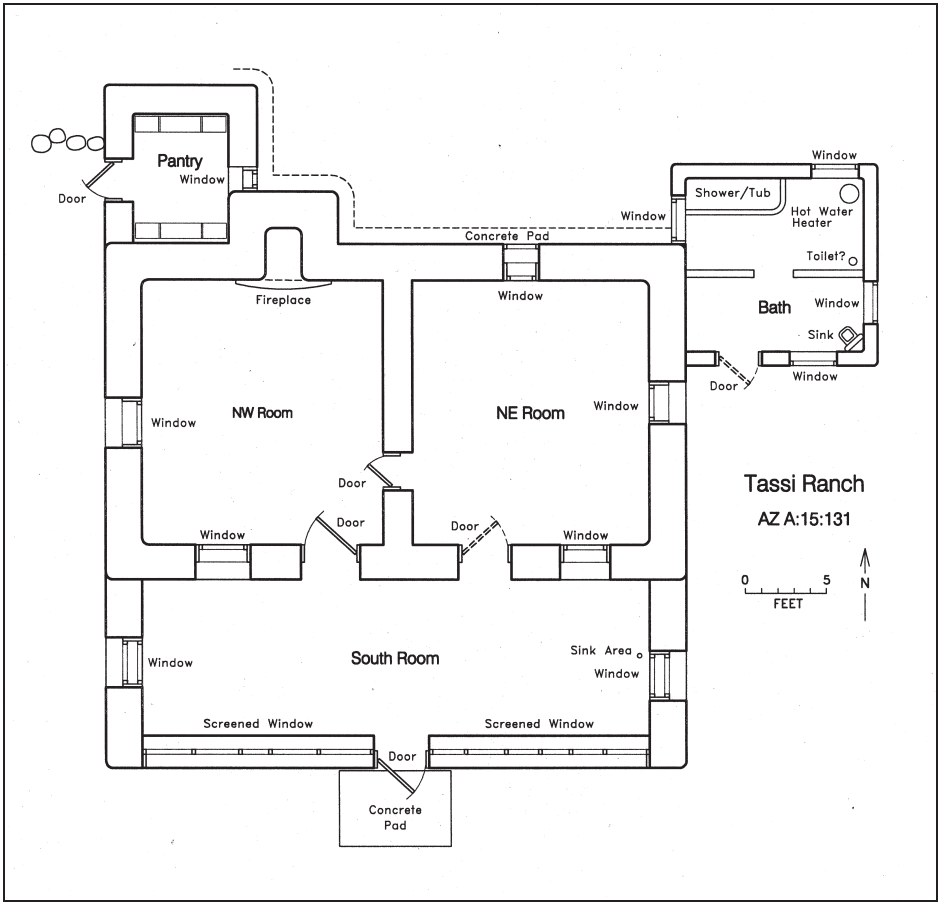
Respectfully submitted,



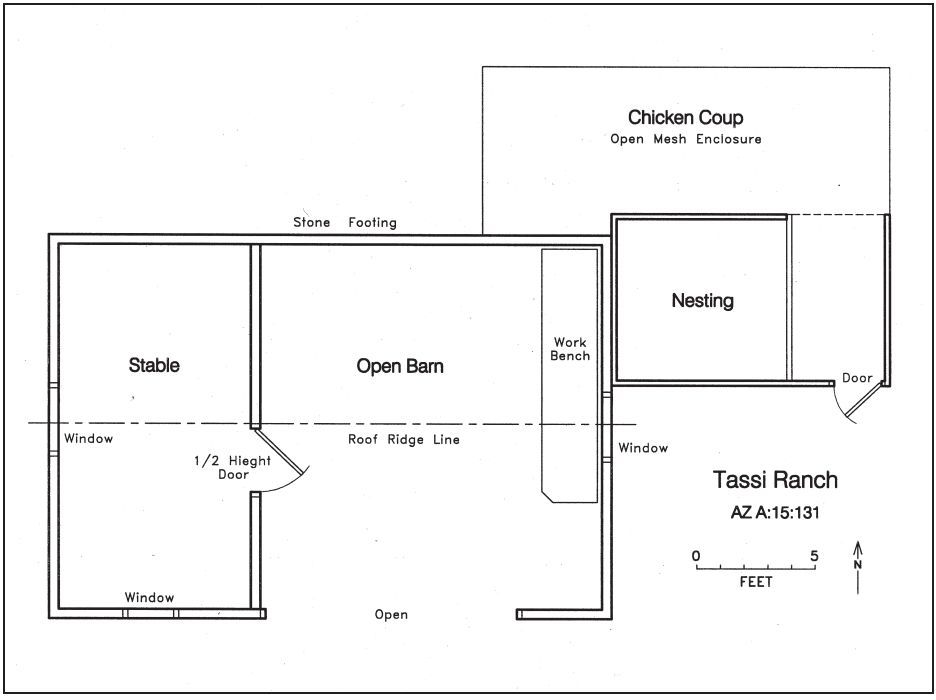
Dennis Swartzell
Certified Arborist
WC - 0309


TASSI RANCH
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NO SCALE
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WATER SOURCE
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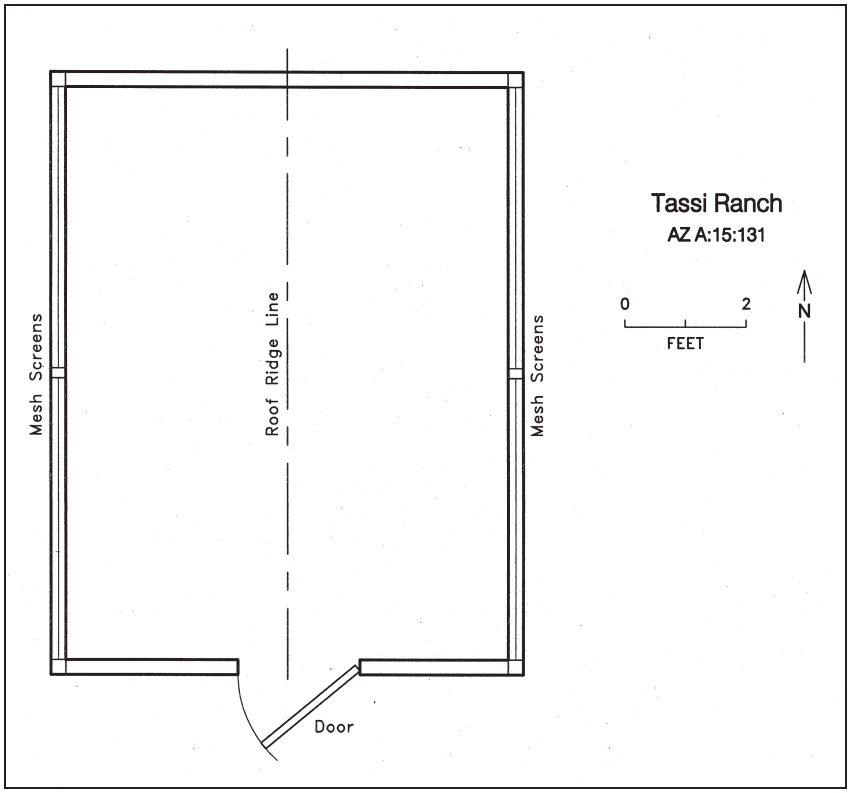
APPENDIX D: As Built floor Plans Ranch Core, 2003



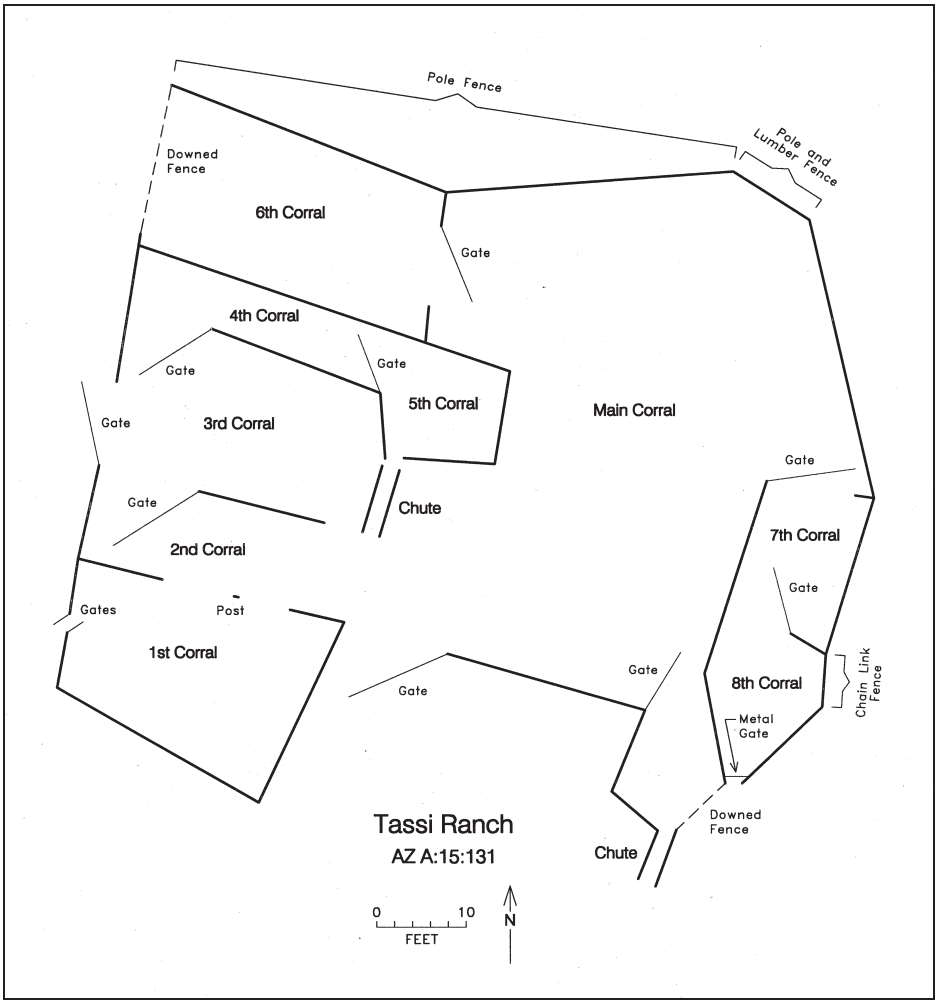
Ranch House floor plan. Excerpted from *Tassi Ranch and Springs Site AZ A:9:131*,National Park Service, Western Archeological and Conservation Center, June 2003.



Barn floor plan. Excerpted from *Tassi Ranch and Springs Site AZ A:9:131*, National Park Service, Western Archeological and Conservation Center, June 2003.



Shed floor plan. Excerpted from *Tassi Ranch and Springs Site AZ A:9:131*,National Park Service, Western Archeological and Conservation Center, June 2003.


Pole Fence
Pole and Lumber Fence
Downed Fence
6th Corral
Gate
4th Corral
Gate
Gate
5th Corral
Main Corral
Gate
3rd Corral
Gate
Chute
Gate
7th Corral
2nd Corral
Gate
Gates
Post
1st Corral
Gate
Gate
8th Corral
Chain Link Fence
Metal Gate
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