

Reintroduction of Agriculture Environmental Assessment/Assessment of Effect

June 2003



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Summary

The National Park Service proposes to reintroduce agriculture to Hubbell Trading Post National Historic Site. John Lorenzo Hubbell opened his trading post in Ganado, Arizona in 1875 and operated his 160 acre homestead and trading post with his family for 90 years. Hubbell Trading Post was established as a National Historic Site by Congress August 28, 1965 and is the oldest continuously operated trading post on the Navajo Nation. The enabling legislation authorized purchase of the "...site and remaining structures of the Hubbell Trading Post at Ganado, Arizona, including the contents of cultural and historical value, together with such additional land and interest in the land...needed to preserve and protect the post and its environs for the benefit and enjoyment of the public". Agriculture was once an integral part of the Hubbell Trading Post operation, but was abandoned for a variety of reasons in the middle of the 20th century. Therefore, in order to fully implement the mandate of Congress, reintroducing agriculture to the HUTR is being proposed.

This Environmental Assessment/Assessment of Effect has been prepared in compliance with the National Environmental Policy Act (NEPA) to provide the decision-making framework that 1) analyzes a reasonable range of alternatives to meet project objectives, 2) evaluates potential issues and impacts to National Historic Site resources and values, and 3) identifies mitigation measures to lessen the degree or extent of these impacts. Two possible alternatives are evaluated for meeting the purpose and need of the proposed action, including a no action alternative and one action alternative. The action alternative aims to recreate a cultivated landscape similar in "feel and look" to Hubbell's operation, while adhering to more modern sustainable practices. Impacts evaluated include National Historic Landmark, Cultural Landscapes, Archaeological Resources, Park Operations, Visitor Use and Experience, Visual Resources, Soils, Wildlife, Vegetation, Water Resources, Air Quality, and Socioeconomic Environment. Mitigation measures are identified within the document.

Public Comment

If you wish to comment on the environmental assessment, you may mail comments to the name and address below. This environmental assessment will be on public review for 30 days and will be due on August 15, 2003. Please note that names and addresses of people who comment become part of the public record. **If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment.** We will make all submissions from organizations, businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety.

Thank you for your participation in this important process.

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CHAPTER 1 - PURPOSE AND NEED

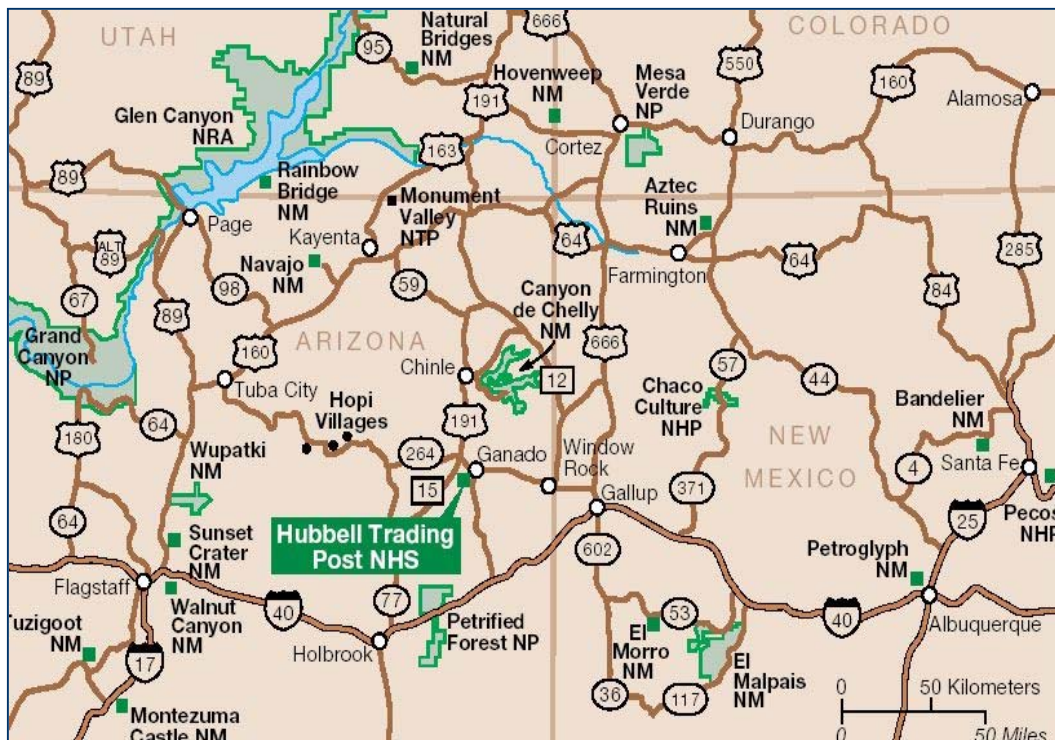
INTRODUCTION

The purpose of this document is to disclose the expected effects to the human environment of various components of the proposed reintroduction of agriculture to the Hubbell Trading Post National Historic Site (HUTR). This document is also intended to provide information necessary for compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1996, as amended.

HUTR was established by Congress on August 28, 1965. The enabling legislation authorized purchase of the "...site and remaining structures of the Hubbell Trading Post at Ganado, Arizona, including the contents of cultural and historical value, together with such additional land and interest in the land...needed to preserve and protect the post and its environs for the benefit and enjoyment of the public...". Congress also specifically indicated that the site should be operated as an active trading post to maintain a living, viable institution not a museum exhibit of an old trading post. Today, the National Park Service operates HUTR in a manner similar to how John Lorenzo Hubbell operated his trading post in the late 1800s and early 1900s; as an active community institution serving the economic, social, traditional, and education needs of Navajo citizens and now park visitors.

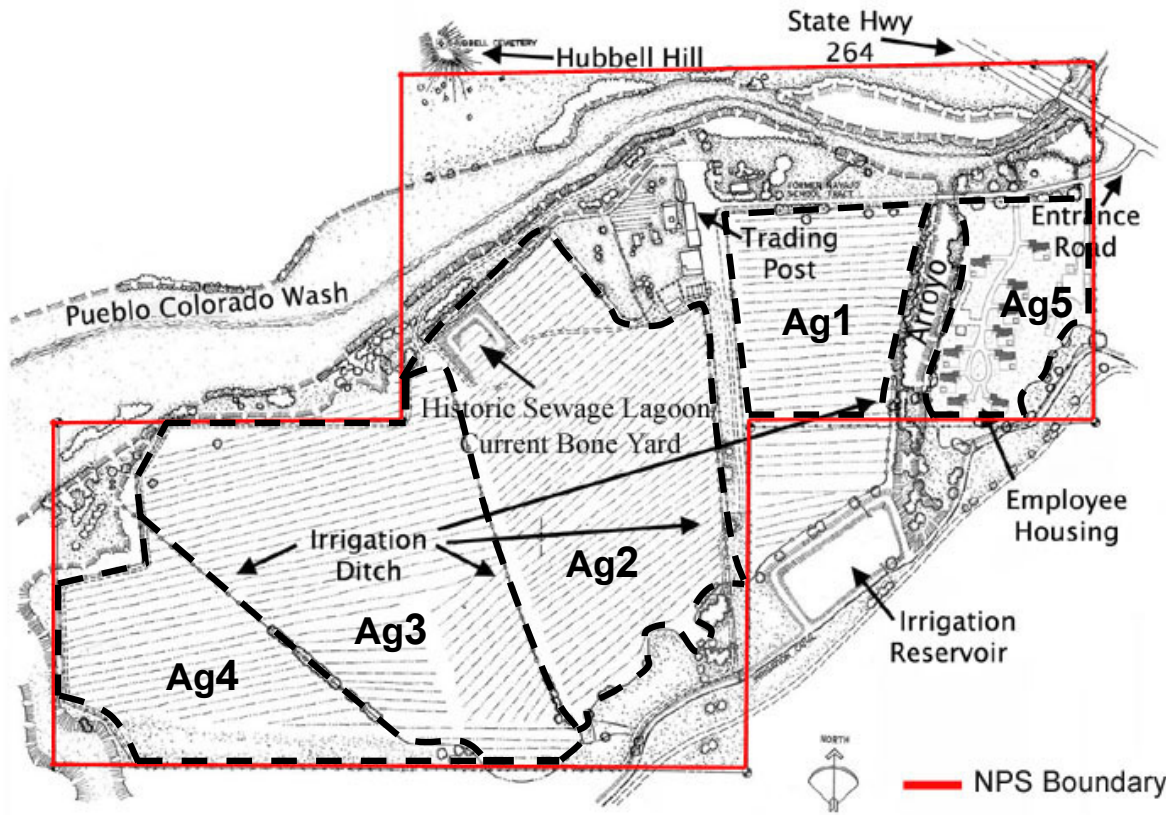
Agriculture was once an integral part of the trading post operations. This was abandoned for a variety of reasons in the middle of the 20th century. The purpose of this document is to disclose the expected effects to the human environment of various components of the proposed reintroduction of agriculture to HUTR.

HUTR is located on the Navajo Nation, in Arizona, approximately one-half mile west of Ganado and 55 miles northwest of Gallup, New Mexico (see Figure 1). The park is located just off Arizona State Highway 264. The National Park Service holds 160 acres in fee title, an inholding within the Navajo Nation (see Figure 2).



Hubbell Trading Post National Historic Site

Figure 1. Location of Hubbell Trading Post National Historic Site.



— — Agricultural Field Boundary

Figure 2. Layout of the Hubbell Trading Post National Historic Site and Agricultural Fields.

Background

As the oldest continuously operated trading post on the Navajo Nation, HUTR offers visitors a chance to experience a piece of history. J.L. Hubbell purchased the trading post in 1878, and the Hubbell family operated the post until it was sold to the National Park Service in 1965. The still-active trading post is operated by a nonprofit organization, Western National Parks Association, in cooperation with the NPS, maintains the traditions and ambience of the historic trading post.

The site consists of the original 160-acre homestead, with the trading post, Hubbell family home, and visitor center as the primary attractions. In 1960, the property was listed in the National Register of Historic Places and was designated a National Historic Landmark. Authorized as a National Historic Site by an act of Congress August 28th 1965, the National Park Service assumed administration of the property in 1967. This legislation allowed for the purchase of the "site and remaining structures...including the contents of cultural and historical value, together with such additional land and interests in land...needed to preserve and protect the post and its environs for the benefit and enjoyment of the public."

The park was established with the intent that the trading post be "operated along the lines close to those that were in effect when it was an active post" (NPS 1998). An important part of the historic use of HUTR included improving the land and developing an irrigation canal and reservoir system to support an agricultural operation. Early cultivation consisted of alfalfa, rye, potatoes, corn and fruit trees. Concurrently, an irrigation system was developed which brought water in a two-mile ditch from an upstream lake diverted off the Pueblo Colorado Wash to a storage reservoir adjacent to the property. With the irrigation system in place, other crops such as wheat, barley, oats and sorghum were introduced to the farm fields. Over the years, a small vineyard was established and fruit trees were planted along the irrigation ditches. A kitchen garden was developed to supplement the Hubbell family meals. By 1913, the agricultural fields had been expanded significantly, and Hubbell had adjusted his agricultural operation to those crops best suited to the specific Ganado environment and his irrigation system.

In 1965, National Park Service acquired the property. Agriculture had been abandoned and the farm fields had reverted to scrubland vegetation. In the 1980's, the upstream Ganado dam was ruled unsafe, the lake was drained and agriculture in the rural valley of Ganado ceased. In 1995, the Bureau of Indian Affairs, Safety of Dams Program rebuilt the dam and Ganado Lake was recreated as a diversion off the Pueblo Colorado Wash.

PURPOSE AND NEED OF PROJECT

This project, to reintroduce agriculture to the farm fields of HUTR, has long been a management goal of the National Park Service; however, the project has never been realized since irrigation water was not available until just recently. In 1998-99, The Bureau of Reclamation (BOR), the Natural Resource Conservation Service (NRCS) and the Navajo Nation Department of Water Resources in conjunction with other federal and local entities joined together in a cooperative venture to provide technical and funding support to replace the old, open ditch irrigation system with a piped system of irrigation. A majority of the new system is now completed from Ganado Lake to the storage reservoir that Hubbell constructed adjacent to what is now park property.

The goal of reintroducing agriculture at Hubbell Trading Post National Historic Site emanates from the enabling legislation for this historic site, which authorized purchase of the, "...site and remaining structures of the Hubbell Trading Post at Ganado, Arizona, including the contents of cultural and historical value, together with such additional land and interest in the land...needed to preserve and protect the post and its environs for the benefit and enjoyment of the public." The project fulfills the development alternative of the *Cultural Landscape Report* (NPS 1998) for agricultural rehabilitation of three fields of the original five fields Hubbell used for farming. The proposed project contributes to the significance and purposes of HUTR as outlined in the *2001-2005 Strategic Plan* prepared for the Government Performance and Results Act (NPS 2000) as follows.

Significance of HUTR

- Is one of the few remaining, continuously operating trading posts representing what was once a common yet significant establishment and form of commerce in the southwestern United States.
- Continues to be a crossroads of cultures, a medium for cultural transfer, an interface for the arts, and site of hospitality, education, communication, and diversity.

- Commemorates the traditional and distinctive role of the 'Indian trader' in the American Southwest as an agent of change influencing economic development and introducing new technology, serving as a focal point for political, financial, and social activity, and guiding and encouraging the expression of Native American authentic arts and crafts.
- Retains the historic integrity of the trading post operation, which includes its museum collection, cultural landscape, buildings, and a nearly continuous archival documentation of its use since the 1870s, unequalled anywhere.
- Is recognized as a National Historic Landmark for its long and rich history of diverse human settlement evidenced by significant archaeological ruins and scatters, and the wealth and abundance of its historic resource and cultural heritage.

Purpose of HUTR

- To conserve and continue Hubbell Trading Post as a living, functioning economic and social institution and way of life, reminiscent of an earlier era of southwestern Anglo and Native American history.
- To preserve and protect the historic and cultural contents, structures, functional arrangement and landscape of Hubbell Trading Post including the trading post itself, Hubbell Home, the grounds and the farm operation for the public to understand, experience and enjoy.
- To identify and utilize Hubbell Trading Post as a pre-eminent site from which to interpret and understand the history and the ethnography of the Navajo people.
- To preserve the intangible elements of feeling and association that emanate from the materials, the workmanship, the spatial organization and the customs of this outstanding example of an old-time trading post.

Project Need

The lack of cultivated farm fields and agricultural activity make it difficult to integrate this historic element into site interpretive programming. There is a need to demonstrate the significant role that farming played in supporting Hubbell's trading and freighting operation which will in turn enrich and enhance the visitor experience to this historic site and complete the total story of the place.

The installation of pipe by the Bureau of Reclamation along the historic orientation of the original Hubbell-designed irrigation system will now effectively and efficiently carry and deliver irrigation water to many of the farm fields along the system including HUTR. Within Ganado, a Water Users Association will self-manage the irrigation system and assess fees to those farmers located along the system for the use of the water. If water becomes available to a farm field, the farmer (including HUTR) must use the water or it is forfeited. Fees are assessed whether the water is available or not although the fees are considerably higher if water is available. Therefore, a secondary project need will be to put this water to beneficial use and to ensure cost of the water assessment will not be wasted.

PROJECT OBJECTIVES

Based on the purpose and need for the project and the internal scoping conducted with both the public and park staff, the following objectives have been identified for the reintroduction of agriculture:

- Develop a farm plan that guides implementation of the selected alternative for reintroduction of agriculture to include phasing or staging of implementation, farm techniques, crop types, land use, and water supply to ensure appropriate agriculture is introduced to the park. This plan should also investigate the feasibility of related activities such as grazing domestic animals and planting fruit trees.
- Rehabilitate the farm fields to include installing an effective water supply, replenishing nutrients, controlling noxious weeds and pests, contouring the land, fencing archaeological sites and protecting the historic stone headgates and ditches.
- Promote sustainability and conservation in all aspects of the agricultural project.
- Investigate alternative sources of labor for management and maintenance of agriculture in the park.
- Create collaborative community partnerships.
- Increase understanding and appreciation of the cultural landscape and agriculture at the park through park outreach and interpretation of the agricultural fields and associated uses (such as grazing), equipment (such as historic farm implements), and products (such as crops used for dyes).
- Encourage research as part of the project to include investigation of crop types, niche markets, marketing opportunities etc.
- Promote education and service-learning opportunities for students and visitors.
- Allow the goods produced from the farm/animals to be used for a variety of products benefiting the park and surrounding community.

ISSUES AND IMPACT TOPICS

During initial project scoping, various agencies and the public were contacted for input regarding potential issues and concerns related to reintroducing agriculture at HUTR. An interdisciplinary team of NPS employees, community representatives and agency specialists were convened to identify issues related to the project. As described in Chapter 5 - Comments and Coordination, one comment from the public or agencies was received during scoping. This comment was general in nature and supported the reintroduction efforts at HUTR. Therefore, National Park Service specialists primarily identified issues and concerns affecting this project.

Once issues and concerns were identified, they were distilled into distinct impact topics to facilitate the analysis of environmental consequences, allowing for a standardized comparison between alternatives based on the most relevant information. The impact topics were identified on the basis of federal laws, regulations, and orders; National Park Service 2001 Management Policies; and National Park Service knowledge of resources.

A summary of the impact topic and rationale for selection/dismissal are given below:

Relevant Impact Topics

Presented below are those topics/resources that may be affected by the project proposal. These issues will be fully addressed in Chapters 3 and 4.

Cultural Resources - Section 106 of the National Historic Preservation Act, as amended in 1992 (16 USC 470 et seq.); the National Park Service's Director's Order #28 Cultural Resource Management Guideline; and National Park Service 2001 Management Policies (NPS 2000b) require the consideration of impacts on historic properties that are listed on or eligible to be listed on the National Register of Historic Places. These policies and regulations require federal agencies to coordinate and consult with State/Tribal Historic Preservation Officers regarding the potential effects to properties listed on or eligible for the National Register of Historic Places.

The National Park Service will protect and manage cultural resources in its custody through effective research, planning, and stewardship and in accordance with the policies and principles contained in the 2001 Management Policies and the appropriate Director's Orders.

Cultural resources at HUTR include national historic landmark status of the park, cultural landscapes, archaeological resources, ethnographic resources and museum collections. The topics of national historic landmark status, cultural landscapes, and archaeological resources have been carried forward for further analysis, as described below.

National Historic Landmark - Hubbell Trading Post was designated as a National Historic Landmark on December 20, 1960 (NPS 1989, 1961, & 1958, Utlely 1959). National Historic Landmarks are nationally significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States. All National Historic Landmarks are listed on the National Register of Historic Places. Therefore, because the proposed reintroduction of agriculture will take place within the boundaries of the National Historic Landmark, this topic is addressed as an impact topic.

Cultural Landscapes - According to the National Park Service's Director's Order #28 Cultural Resource Management Guideline, a cultural landscape is a reflection of human adaptation and use of natural resources, and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. A Cultural Landscape Report for HUTR conducted by the National Park Service (NPS 1998) concluded that HUTR qualifies as a cultural landscape; and since the agricultural fields are a contributing element of the cultural landscape, this topic will be addressed.

Archaeological Resources - In addition to the National Historic Preservation Act and the National Park Service 2001 Management Policies (NPS 2000b), the National Park Service's Director's Order #33 Archaeology, affirms a long-term commitment to the appropriate investigation, documentation, preservation, interpretation, and protection of archaeological resources inside units of the National Park System.

Archaeological resources at HUTR were re-surveyed in 2002 to re-identify and reassess historic and prehistoric cultural remains that had been identified during previous archaeological surveys of the 160-acre national historic site. The information from this survey is documented in the *Evaluation of Previously Recorded Archaeological Sites and Geomorphology at the HUTR, Ganado, Arizona* (NPS 2002b). According to the resurvey, six archaeological sites exist within HUTR for which the park has management responsibility. Because most of these sites exist within the agricultural fields and could be affected by the proposed project, the topic of archaeological resources has been carried forward for further analysis.

Park Operations - As this project is implemented, National Park Service will determine who will manage and maintain the agricultural operation. A lease arrangement with individual Ganado farmers might be feasible. Opportunities may exist for students, researchers, community groups, agricultural youth programs or elders to utilize portions of the fields for traditional, educational, research or demonstration purposes. Operational changes and oversight will be necessary as the agriculture activities are implemented. NPS supervision and monitoring of activities will be required. Farmer access to the fields during off-hours may be necessary. The agricultural and pastoral products harvested may affect the trading post and its operations. The management of pests associated with crops and possible mosquito concerns resulting from the re-introduction of water to the site may require intervention. Because these changes will have a measurable effect on NPS and trading post staff, the topic of park operations has been carried forward for further analysis.

Visitor Use and Experience - Visitors may be allowed access to the periphery of the cultivated fields on a designated path, which will provide them with an interactive experience of the farm environment and activity. Utilization of the fields by visitors will enhance their understanding and appreciation of the National Historic Site. Visitors will be attracted by the farm equipment and animals, visible to all either in action or at rest. Products from the farm operation may be available to visitors, and the links to the overall operation of the Hubbell homestead will be more evident. The proposed project will also benefit neighboring farmers, researchers and students who would be able to witness and learn about the agricultural operations. Nevertheless, potential issues exist in coordinating visitors' use with that of the farmer and his operations. Therefore, the topic of visitor use and experience has been carried forward for further analysis.

Visual Resources - The proposed location for the reintroduction of agriculture is a maximum of approximately 90-acres of the originally cultivated 110-acres. Since the abandonment of the agricultural fields, vegetation typical of desert scrubland now dominates the landscape. Because this project will modify the existing scrubland to an agricultural landscape, the visual character of the project area will be affected. Therefore, the topic of visual resources has been carried forward for further analysis.

Soils - The soils of HUTR include clays, sandy clay loam, and sandy loam (NPS 1980). Most are deep and dry, with an alluvium parent material. The soil has moderate permeability and runoff is slow. Cultivation and nutrient enhancement of the fields will have effects on the chemical, physical, and biological components of the existing soils, therefore the topic is carried forward.

Wildlife - The National Park Service Inventory and Monitoring Program has initiated development of a database of the wildlife species at HUTR (NPS 2002). Irrigation and cultivation may create fluctuations in wildlife populations during and after implementation of agricultural activity. It is likely that the reintroduction of fruit trees will increase the territories and populations of certain bird species. The disturbance of soils may affect rodents and reptiles in particular. Agricultural activity will most likely increase wildlife presence, increasing herbivore presence initially, and carnivores subsequently. Therefore, the topic of wildlife has been carried forward for further analysis.

Vegetation - The project area is located in the previously cultivated acreage of HUTR, an area that has reverted to successive "scrub" vegetation due to its previous disturbance. According to the 2001 Annual Report for the first year of Plant Inventories at HUTR and Navajo National Monument as part of the National Park Service Inventory and Monitoring Network for the Southern Colorado Plateau Network, no rare or threatened and endangered species or special status plants occur in the immediate project area. The reintroduction of agriculture would involve rigorous removal of existing field vegetation. The impacts on vegetation due to the implementation of irrigation and agricultural production will be measurable and therefore, the topic of vegetation has been carried forward for further analysis.

Water Resources - The Pueblo Colorado Wash is a significant natural resource of HUTR and is the primary reason for the location of the archaeological sites of the park and the crossroads location of the Trading Post itself.

The Ganado Irrigation Water Conservation Project for the Ganado Chapter of the Navajo Nation has been pivotal in realizing the reintroduction of agriculture in Ganado as well as at HUTR. Water is critical to the reintroduction of agriculture at HUTR. Without the delivery of irrigation water by the Ganado Irrigation Water Conservation Project, the project will not succeed. Management and maintenance of the Ganado irrigation system will be outside the responsibilities of the park but will influence the actions of the park. Once water is delivered to the Hubbell reservoir, it will be stored there until released to the Hubbell farm fields.

Since the irrigation water is being diverted from the Pueblo Colorado Wash upstream from the park and since the park has undertaken enhancement of the stream channel and riparian environment of the Pueblo Colorado Wash within park boundaries, it will be necessary to monitor the effects of this diversion and the runoff from other farm fields on the water quality and quantity reaching the park reach of the Pueblo Colorado Wash. Since the project may have direct and indirect effects on the water resources, this topic has been carried forward for further analysis.

Air Quality - The Clean Air Act of 1963 (42 U.S.C. 7401 et seq.) was established to promote the public health and welfare by protecting and enhancing the nation's air quality. The act establishes specific programs that provide special protection for air resources and air quality related values associated with National Park Service units. Section 118 of the Clean Air Act requires a park unit to meet all federal, state, and local air pollution standards. HUTR is designated as a Class II air quality area under the Clean Air Act. A Class II designation indicates the maximum allowable increase in concentrations of pollutants over baseline concentrations of sulfur dioxide and particulate matter as specified in Section 163 of the Clean Air Act. Further, the Clean Air Act provides that the federal land manager has an affirmative responsibility to protect air quality related values (including visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse pollution impacts.

Mechanical activities such as tilling and operating equipment could result in temporary increases of vehicle exhaust, emissions, and fugitive dust in the general project area. Any exhaust, emissions, and fugitive dust generated from farming activities related to agricultural production will be seasonally temporary and would likely dissipate rapidly because air stagnation at HUTR is rare. Nevertheless, the use of farm equipment could create air pollution periodically over a long-term span. Soil management practices will also have an effect on fugitive dust. The impact of these actions needs to be explored. Therefore, this topic has been carried forward for further analysis.

Socioeconomic Environment -The proposed action has the potential to both change local and regional land use or appreciably impact local businesses through the example it may set through its demonstration potential. Implementation of the proposed action could provide a beneficial impact to the economies of nearby Ganado, Arizona, as well Apache County due to increases in employment opportunities for the farming workforce and revenues for local businesses generated from these additional farming/pastoral products and workers. The benefits of locally produced goods could have a positive economic effect by keeping revenues within the community. The topic of socioeconomic environment has been carried forward for further analysis.

Impact Topics Dismissed From Further Analysis

Some impact topics have been dismissed from further consideration, as listed below. The rationale for dismissing these specific topics is stated for each resource.

Museum Collections - According to Director's Order #24 Museum Collections, the National Park Service requires the consideration of impacts on museum collections (historic artifacts, natural specimens, and archival and manuscript material), and provides further policy guidance, standards, and requirements for preserving, protecting, documenting, and providing access to, and use of, National Park Service museum collections. The proposed project is not expected to have any effects on museum collections. The agricultural museum artifacts used by the Hubbell family will not be used for any farming activity. Therefore, the topic of museum collections has been dismissed from further analysis.

Ethnographic Resources - According to the National Park Service's Director's Order #28 Cultural Resource Management, ethnographic resources are defined as any site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it, and the National Park Service should try to preserve these resources. American Indian tribes traditionally associated with the lands of HUTR were apprised of the proposed project by a letter sent to them on September 25, 2002 (see Chapter 5.0 Comments and Coordination and Appendix A). No comments on the proposed project were received from any of the tribes contacted. To date, no special regulations, policies, or provisions of the Navajo Nation have been identified with regards to this project. Therefore, the topic of ethnographic resources has been dismissed from further analysis.

Geology and Topography - According to the National Park Service's 2001 Management Policies, the National Park Service will preserve and protect geologic and topographic features from adverse effects of human activity, while allowing natural processes to continue (NPS 2000b). HUTR is comprised of 160 acres of land that lies in a shallow valley adjacent to the Pueblo Colorado Wash. Low-level sandstone buttes and mesas surround the site, which sits primarily on an upland terrace adjacent to the Pueblo Colorado (NPS 1980). The proposed location for the agricultural site is predominately flat, with no substantial natural geologic features. The proposed action would not change the existing geologic or topographic features. Therefore, because the project would result in negligible effects to geology and topography, this topic has been dismissed.

Threatened, Endangered, and Candidate Species, and Species of Special Concern - The Endangered Species Act of 1973 requires examination of impacts on all federally-listed threatened, endangered, and candidate species. Section 7 of the Endangered Species Act requires all federal agencies to consult with the U.S. Fish and Wildlife Service (or designated representative) to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitats. In addition, the 2001 Management Policies and Director's Order #77 Natural Resources Management Guidelines require the National Park Service to examine the impacts on federal candidate species, as well as state-listed threatened, endangered, candidate, rare, declining, and sensitive species (NPS 2000b). For the purposes of this analysis, the Navajo Nation Department of Fish and Wildlife was contacted with regards to federally-listed species, and the Arizona Game and Fish Department was contacted with regards to state-listed species to determine those species that could potentially occur at HUTR.

Navajo Nation Department of Fish and Wildlife

Because the proposed project occurs within the boundaries of the Navajo Nation, the Department of Fish and Wildlife (NNDFW) was contacted with regards to threatened and endangered species at HUTR (NNDFW 2002).

The following eight wildlife species of concern were identified by the NNDFW as occurring within the region, as based on coarse habitat characteristics and species range information

- Black-footed Ferret (*Mustela nigripes*)¹
- Northern Leopard Frog (*Rana pipiens*)
- Southwestern Willow Flycatcher (*Empidonax traillii extimus*)¹
- Golden Eagle (*Aquila chrysaetos*)
- Bald Eagle (*Haliaeetus leucocephalus*)¹
- Mountain Plover (*Charadrius montanus*)
- Peregrine Falcon (*Falco peregrinus*)
- Waterfowl and shorebirds

¹ These species are federally listed by the US Fish and Wildlife Service as threatened or endangered.

The above-listed bird species including southwestern willow flycatcher, golden and bald eagles, mountain plover, and peregrine falcon range over large areas of the region and are potential transients in the park.

However, there are no known nesting sites in the park, and parklands are not vital for foraging or roosting. Further, observations during a survey for southwestern willow flycatcher conducted in spring and summer of 2002 indicated no nesting, breeding, or territorial behavior for southwestern willow flycatcher along the Pueblo Colorado Wash within the park (ESM 2002). None of these listed species are known to occur in the proposed project location, and this location does not contain suitable habitat for these species due to its disturbed condition and lack of vegetation and water.

Further protection under the Migratory Bird Treaty Act makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products. In addition, this act serves to protect environmental conditions for migratory birds from pollution or other ecosystem degradations.

Arizona Game and Fish Department

Correspondence from the State of Arizona Game and Fish Department indicates that only the Glen Canyon Cactus (*Sclerocactus parviflorus*) occurs as a special status species and has been documented as occurring in the project area (3-mile buffer). According to the 2001 Annual Report for the first year of Plant Inventories at HUTR and Navajo National Monument as part of the National Park

Service Inventory and Monitoring Network for the Southern Colorado Plateau Network, no rare or threatened and endangered species or special status plants occur in the immediate project area.

Farming-related noise could potentially disturb transient bird species, but these adverse impacts would be 1) temporary, lasting only as long as mechanized operations, and 2) negligible, because suitable habitat for transient birds is found throughout the region. Therefore, because no federally- or state-listed species are known to occur in the project area, the topic of special status species was dismissed from further analysis.

Wetlands - For regulatory purposes under the Clean Water Act, the term wetlands means "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas."

Executive Order 11990 Protection of Wetlands requires federal agencies to avoid, where possible, adversely impacting wetlands. Further, Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers to prohibit or regulate, through a permitting process, discharge or dredged or fill material or excavation within waters of the United States. National Park Service policies for wetlands as stated in 2001 Management Policies and Director's Order #77-1 Wetlands Protection, strive to prevent the loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In accordance with DO #77-1 Wetlands Protection, proposed actions that have the potential to adversely impact wetlands must be addressed in a Statement of Findings for wetlands.

The proposed location for the reintroduction of agriculture is a previously cultivated, open field with "desert scrub" vegetation. No wetlands exist in the proposed location for the reintroduction of agriculture. Therefore, because there are no impacts to wetlands, a Statement of Findings for wetlands will not be prepared, and the impact topic of wetlands has been dismissed.

Floodplains - Executive Order 11988 Floodplain Management requires all federal agencies to avoid construction within the 100-year floodplain unless no other practicable alternative exists. The National Park Service under 2001 Management Policies and Director's Order #77-2 Floodplain Management will strive to preserve floodplain values and minimize hazardous floodplain conditions. According to Director's Order #77-2 Floodplain Management, certain construction within a 100-year floodplain requires preparation of a Statement of Findings for floodplains.

While the Pueblo Colorado Wash is dry much of the year, periodic intense rainfall causes flooding on the main stem and tributary washes. Much of HUTR is located on a terrace above these flood levels, including all of the park's agricultural lands. The 100-year and 500-year floodplains were determined for HUTR by the Los Angeles District Corps of Engineers (NPS 1980). According to this data, the proposed location for the agricultural fields is located outside of the 100-year and 500-year floodplains for the Pueblo Colorado Wash. A Soil Erosion Study was conducted at the park, which resulted in the same conclusions; that the proposed location for the agricultural fields is outside the 100-year and 500-year floodplains for the Pueblo Colorado Wash (NPS 1983). Therefore, because the project occurs outside the floodplains, a Statement of Findings for floodplains will not be prepared, and the topic of floodplains has been dismissed.

Indian Trust Resources - Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by the Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes.

There are no Indian trust resources at HUTR. The lands comprising the park are not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Therefore, the project will have no impact on Indian trust resources, and this topic was dismissed as an impact topic.

Prime and Unique Farmlands - The Farmland Protection Policy Act of 1981, as amended, requires federal agencies to consider adverse effects to prime and unique farmlands that would result in the conversion of these lands to non-agricultural uses. Prime or unique farmland is classified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), and is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. According to NRCS, the land must be irrigated to be considered prime or unique farmland. The NRCS verified that currently the fields do not qualify as prime or unique (NRCS 2002). Therefore, the topic of prime and unique farmlands was dismissed as an impact topic.

Soundscape Management - In accordance with 2001 Management Policies and Director's Order #47 Sound Preservation and Noise Management, an important component of the National Park Service's mission is the preservation of natural soundscapes associated with national park units (NPS 2000b). Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all the natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive and can be transmitted through air, water, or solid materials. The frequencies, magnitudes, and duration of human-caused sound considered acceptable varies among National Park Service units as well as potentially throughout each park unit, being generally greater in developed areas and less in undeveloped areas.

The proposed location for the reintroduction of agriculture and all irrigation system construction activity would occur within a maximum of 90 acres of the historically farmed 110 acres of HUTR. In the project site, the protection of a natural ambient soundscape and/or opportunity for visitors to experience natural sound environments is not an objective. The park is within close proximity to Ganado and Navajo Route 3 (State Highway 264). Visitors generally do not come to HUTR specifically seeking or expecting the quiet, intermittent sounds of nature.

Existing sounds in the historic fields are generated from vehicular traffic (from vehicles on the highway adjacent to the park), people, domestic animals such as dogs, some wildlife such as birds, and wind. Sound generated by the long-term operation of agricultural production may include the operation of farm machinery; livestock; and people working within the fields. Because the area already contains man-made noises, the long-term agricultural operation is not expected to detract appreciably from the general noise levels of the area. Therefore, the topic of soundscape management was dismissed as an impact topic.

Lightscape Management - In accordance with 2001 Management Policies, the National Park Service strives to preserve natural ambient landscapes, which are natural resources and values that exist in the absence of human caused light (NPS 2000b). HUTR strives to limit the use of artificial outdoor lighting to that which is necessary for basic safety requirements. The park also strives to ensure that all outdoor lighting is shielded to the maximum extent possible, to keep light on the intended subject and out of the night sky. The existing lightscape in the general project area includes lighting from the park residences and from neighboring buildings on the Navajo Nation . The proposed action will not incorporate any exterior lighting. Most farming activities will occur during daylight hours; therefore, this topic has been dismissed.

Environmental Justice - Executive Order 12898 General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. This project will have no disproportionate impacts on any population. Therefore, environmental justice has been dismissed as a topic for further analysis.

CHAPTER 2 – ALTERNATIVES

INTRODUCTION

Between the spring and fall of 2002, an interdisciplinary team of NPS employees, community representatives, and agency specialists met to plan and develop project alternatives. These meetings and subsequent discussions resulted in the definition of project objectives as described in *Chapter 1 - Purpose and Need*, and formed the basis from which alternatives were developed.

Several alternatives were considered in the conceptual phases of this project. They ranged from reintroduction of agriculture that strictly adhered to historic practices to utilizing predominately modern farm techniques. It was decided that an alternative that allowed maximum flexibility to incorporate both historic and modern components was the preferred alternative. For example, a flexible alternative enables HUTR to implement modern water conservations techniques, as well as, plant crops that are represented historically. Further, a flexible alternative allows for educational opportunities and a diversified crop structure that reflects local demand.

A total of three action alternatives and the No Action Alternative were identified for this project. Two of the action alternatives were dismissed from further consideration early in the process as described in the following section. Therefore, one action alternative (Preferred Alternative) and the No Action Alternative were carried forward for further evaluation. Tables summarizing components of the alternatives carried forward for further analysis and associated impacts are presented at the end of this chapter.

ALTERNATIVES CONSIDERED AND DISMISSED

The following alternatives were considered for project implementation, but were ultimately dismissed from further analysis.

Strict Historic Agriculture

This alternative restored the farm fields to their strict historic context, as J.L. Hubbell farmed them during his most productive years. Although measures would be taken to conserve water and environmental integrity, the goal of achieving authentic historic crops, field design and layout was the top priority.

Alfalfa would have been the major cultivated crop since it was the major cash crop that supported the horses for the Hubbell freighting operation. Other historically accurate crops such as oats, rye and corn were included in addition to fruit trees along the irrigation canals. Choosing livestock of the true historical breeds would be a high priority. No modern industrial/commercial equipment would have been utilized. Draft animals would have been utilized to pull plows and other equipment. All tools and equipment would resemble those used at the turn of the century. Post and rail fencing as used by Hubbell would be installed.

Flood irrigation would have been implemented. The original irrigation ditches and stone head gates used in Hubbell's era would be utilized to deliver and distribute water to the fields. Because they have not been maintained since the cessation of agriculture in the 1950's, they would require major rehabilitation to function again for irrigation. Because of their status on the List of Classified Structures, this restoration of the historic ditches and stone head gates would closely follow the Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation.

This alternative addressed the intent of operating the post along the lines closest to those that were in effect when it was an active post. However, it did not meet the project objectives, was too restrictive, was not environmentally responsible, and had considerably greater costs associated with implementation. Therefore, it was dismissed from further consideration.

Simple Crop/Pasture Rotation Mix Alternative

This alternative consisted of implementing a simple crop/pasture rotation that would support a cash crop enterprise. This alternative would adhere to a crop/pasture composition developed to maximize profits according to the market demands. In this region, that would most likely result in an alfalfa crop monoculture. It was initially considered due to its simplicity and feasibility.

Nevertheless, it was dismissed as too restrictive, too wasteful of water and lacking diversity for an environmentally beneficial habitat. Monocultures are susceptible to pest outbreaks and with a stated preference for minimal use of pesticides; this alternative would be difficult to manage.

ALTERNATIVES IDENTIFIED FOR FURTHER ANALYSIS

Alternative A - No Action Alternative

Under this alternative, agriculture and agriculture-related activities such as grazing would not be reintroduced. The cultural landscape of Hubbell Trading Post National Historic Site would not portray the agricultural activities that supported the trading and freighting operation. NPS would not utilize water from the Ganado Irrigation Water Conservation project but because of its location along the irrigation route, NPS would be obligated to pay the Ganado Water Users Association the much higher assessment rate for available water. Leasing of the agricultural fields to local farmers would not be an option. Researchers, farmers and students would not be able to utilize the fields as a demonstration farm. The fields would not be rehabilitated, nor would soil amending occur. Weed and pest control would not occur.

Alternative B - Sustainable Production (Preferred Alternative)

Under this alternative, the fields at HUTR would be comprised of a diverse mix of cash cropping, grazing, and demonstration/experimental farming. This alternative aims to recreate the view of a cultivated landscape similar in "feel and look" to Hubbell's operation, while adhering to more modern environmental and social practices that are feasible, healthy, and sustainable. This alternative allows for flexibility ranging from simple to complex strategies depending upon farmer support, climatic situation, and resources of all those involved. A high emphasis will be placed on water conservation and minimizing chemical inputs. The different components would be phased-in incrementally according to resources, plan development, field preparation and farmer participation. The following are specific components related to this alternative:

Crop Type - This alternative allows for a diversified mix of crops. This includes cash crops, those used historically and those utilized locally for traditional, health, medicinal, ceremonial, and dye purposes. Experimental crops including demonstration or research plots could be included. These experimental crops might provide insight into developing sustainable agriculture and "niche" markets in the region. Fruit trees would also be included. Division of the final yield from the fields will be determined in the lease arrangement between the farmer and the National Park Service.

Irrigation - Water conservation methods of irrigation such as drip, gated pipe and sprinklers would be considered for use based upon expert advice. Flood irrigation will not be utilized due to poor water conservation.

Grazing - This alternative might experiment with traditional churro sheep and other locally adapted livestock that would demonstrate the environmental advantages of water conservation and adaptability. Sustainable grazing methods would be employed and manure wastes recycled within the farm. Grazing locations will be chosen according to biotic factors and site activities and will be rotated in accordance with sustainable grazing methodology.

Work Force - The fields would be leased to a farmer willing to work within the modern model of sustainable agriculture and “holistic” management. These are terms used for the modern practices that have developed in agriculture to account for environmental and social sustainability. This may require consultation with associated organizations and available resources. Schools may utilize portions of the fields to teach sustainable agricultural methods to students. The National Park Service will choose a farmer based on these criteria and will monitor activities so that certain standards are met.

Equipment - Choice of equipment by the farmer is flexible and would be individually or collectively owned. Equipment will be chosen in consultation with NPS according to the recommendations developed in the subsequent Farm Plan.

Weed Control - The use of chemical herbicides would not be allowed due to farmer and visitor safety. Manual weeding and the use of biological control methods that are environmentally sound may be used.

Soil Amendments - Synthetic fertilizers will not be used due to the negative effects on wildlife and ecosystem function. Instead, natural fertilizers such as animal manure, green manure (fresh, green plant matter) and composts may be used. Nitrogen fixing plants may be grown to replace/enhance nitrogen within the soils.

Topographic Alterations - The use of flood irrigation will not be used to maintain the historic terraces, but other methods of topography conservation may be considered. Attempts may be made to stabilize and utilize or reconfigure and conserve the historic terraces to maintain the character of the cultural landscape.

Education and Interpretation - This alternative includes the development of demonstration plots to be used by students, teachers, researchers, or other interested parties, in consultation with the park, for growing various plant types and experimenting with new techniques/equipment. The potential exists for tapping “niche” markets with specialty, locally -grown, organic and Navajo products. Marketing resources and education would provide the links to local restaurants, farmers’ markets and education/health institutions that would value the locally produced/ environmentally sound/culturally reinforcing characteristics of these demonstration crops. Interpretation of the fields and farming activity will be provided for park visitors.

Fencing - No permanent new fencing will be used. Temporary, yet reinforced fencing will be used to contain livestock, protect archaeological sites and to keep visitors out of sensitive areas.

Implementation Sequencing/Phasing - Initial cover crops, green fertilizers, and nitrogen fixers may be used to prepare the soils for higher yield. Consultation would occur between NPS, farmers and agricultural scientists to determine a time frame for phasing and implementation.

Monitoring - The farmer will monitor the soils and biotic properties of the fields to assure that positive trajectories are being attained. The farmer will provide NPS with monitoring data developed in conjunction with NPS and other agricultural specialists. Baseline data exists to make comparisons with ideal conditions. Consultation with agricultural scientists and soil specialists will assist with determining appropriate goals.

This alternative is based on preliminary assessments and best information available at the time of this writing. Specific factors used to describe the alternative are only estimates and could change during preparation of the Farm Plan. If changes are made during the development of the farm plan and/or during implementation, and are not consistent with the intent and effects of the selected alternative, then additional compliance would be completed, as appropriate.

IDENTIFICATION OF THE ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act of 1969 (NEPA), which guides the Council on Environmental Quality (CEQ). The CEQ provides direction that "the environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- Assure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- Preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and,
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Using selection factors from the Choosing by Advantages process and through the process of internal scoping, scoping with the public and other agencies, the environmentally preferred alternative selected is Alternative B. Alternative B best meets the purpose and need for action and best addresses overall Park Service objectives and evaluation factors. Alternative B allows the flexibility to incorporate important historic and cultural aspects of the reintroduction of agriculture to HUTR while also implementing water conservation and other environmentally responsible practices that reflect best farming methodologies. While the principle constituents of Alternative B will be in place, it will be implemented incrementally according to resources, plan development, field preparation and farmer participation. Alternative B meets all of the above criteria. No new information came forward from public scoping or consultation with other agencies to necessitate the development of any new alternatives, other than those described and evaluated in this document. Therefore, Alternative B is recommended as the Preferred Alternative and meets both the purpose and need and the project objects.

MITIGATION MEASURES FOR THE ACTION ALTERNATIVE

The following mitigation measures have been developed to minimize the degree and/or severity of adverse effects, and would be utilized during implementation of the action alternative, as needed:

- Significant archaeological sites will be avoided. Disturbance to these sites from farming activities or grazing will not be permitted, and avoidance mechanisms such as fencing may be erected to deter human disturbances. A professional archaeologist will be consulted during the development of the farm plan to determine the appropriate boundaries for avoiding significant sites.
- The National Park Service would ensure that all those involved with the fields are informed of the penalties for illegally collecting artifacts or intentionally damaging archaeological sites or historic properties. They would also be instructed on procedures to follow in case previously unknown archaeological resources are uncovered in the fields.
- The use of agrochemicals such as pesticides, fungicides, herbicides, and synthetic fertilizers will be regulated in order to minimize hazards to visitor safety, water quality, and soil conditions.
- Temporary protective measures (visible markers and/or fencing) will be taken to preserve the historic irrigation ditches and stone head gates during the installation/construction of a new irrigation system.

- To minimize the potential for impacts to park visitors and park employees living in nearby residences, variations on the timing of mechanized farm activity would be considered. This might include implementing daily mechanized farming activity curfews such as not operating farm equipment between specified hours. The National Park Service will determine this in consultation with the farmer(s).

Table 1. Comparison of Components of each Alternative.

Component	Alternative A (No Action Alternative)	Alternative B - Sustainable Production (Preferred Alternative)
Crop Type	No crop production. Fallow fields remain unproductive.	Sustainable production including cash crops, crops used historically and those used locally for traditional, medicinal, ceremonial and dye purposes. Fruit trees along the irrigation canals. Experimental crops for sustainable agriculture and “niche” markets.
Irrigation	No irrigation would take place, however water user fees would still be charged to HUTR.	Water conservation methods of irrigation such as drip, gated pipe and sprinklers.
Grazing	Current grazing practices are unchanged.	Reintroduction of traditional livestock such as churro sheep and other locally adapted livestock to emphasize water conservation and adaptability within the framework of maintaining a healthy, sustainable grazing regime.
Work Force	None required.	Leased to a farmer willing to work within the model of sustainable agriculture and “holistic” management. Practices based on environmental and social sustainability. Schools may utilize portions of the fields to teach sustainable agricultural methods.
Equipment	None required.	Choice of equipment is flexible and will be individually or collectively owned. Equipment will be chosen in consultation with NPS according to the recommendations developed in the Farm Plan.
Weed Control	Weed growth would continue unabated.	Manual weeding and the use of biological control methods that are environmentally sound may be used.
Soil Amendments	None.	Natural fertilizers such as animal manure, green manure (fresh, green plant matter) and composts may be used. Nitrogen fixing plants may be grown to replace/enhance nitrogen within the soils.
Topographic Alterations	None.	Attempts may be made to stabilize and utilize or reconfigure and conserve the historic terraces to maintain the character of the cultural landscape.
Education and Interpretation	Continued viewing of the farming areas by park visitors on a casual basis.	Demonstration plots to be used by students, teachers, researchers for growing various plant types, experimenting with new techniques. Tapping “niche” markets with specialty, locally -grown, organic and Navajo products. Links to local restaurants, farmers’ markets and education/health institutions that would value the locally produced, environmentally sound/culturally reinforcing characteristics of these demonstration crops. Interpretation of the fields will be provided for park visitors.
Fencing	None required.	No permanent, new fencing will be used. Temporary, reinforced fencing will be used to contain livestock, protect archaeological sites and to keep visitors out of sensitive areas.

Component	Alternative A (No Action Alternative)	Alternative B - Sustainable Production (Preferred Alternative)
Implementation Sequencing/ Phasing	None required.	Initial cover crops, green fertilizers, and nitrogen fixers may be used to prepare the soils for higher yield.
Monitoring	None required.	The farmer will monitor the soils and biotic properties of the fields. The farmer will provide NPS with monitoring data developed in conjunction with NPS and other agricultural specialists. Baseline data exists to make comparisons with ideal conditions.

Table 2. Comparison of Impacts by Topic for each Alternative.

Impact Topic	Alternative A (No Action)	Alternative B – Sustainable Production (Preferred Alternative)
Cultural Resources -National Historic Landmark -Cultural Landscape -Archaeological Resources	No changes to cultural resources. Overall effect: <i>Negligible</i>	No adverse effect to cultural resources will result from this alternative. The reintroduction of agriculture will enhance the cultural landscape of the HUTR. Overall effect: Negligible – No Adverse Effect
Park Operations	No changes to current park operations. Overall effect: <i>Negligible</i>	Management, maintenance and supervision of the agriculture program will be required by park staff. Lease arrangements with local farmers will be the goal. Opportunities for agricultural youth programs or elders, students, and researchers will exist. Overall effect: Short-term minor adverse
Visitor Use and Experience	No changes to the current visitor use and experience will occur. Overall effect: <i>Negligible</i>	Enhanced visitor use and experience will be realized. Utilization of the agricultural fields by area visitors will enhance their appreciation and understanding of the National Historic Site. Overall effect: <i>Long-term moderate benefit</i>
Visual Resource	The abandoned fields will continue to compose the visual landscape. Overall effect: <i>Negligible</i>	The development of an agricultural visual setting in association with the HUTR operations will be visually pleasing to park visitors and will benefit their overall park experience. Overall effect: <i>Long-term moderate benefit</i>
Topography and Soils	No changes and current erosional forces will continue. Overall effect: <i>Long-term moderate adverse</i>	Topography will remain relatively unchanged. Soils will be amended, organically as possible, to increase nutrients. Overall effect: <i>Long-term moderate benefit</i>
Wildlife	Populations will generally remain the same. Overall effect: <i>Negligible</i>	Negligible impacts to general populations. Overall effect: <i>Negligible</i>
Vegetation	Vegetation is characteristic of a disturbed successional community and will remain unchanged. Overall effect: <i>Negligible</i>	Removal of vegetation on-site. Impact to overall vegetation composition and characteristics of the park is negligible. Overall effect: <i>Long-term moderate benefit</i>
Water Resources	No changes in water usage will take place, however water district fees will be charged to HUTR. Overall effect: <i>Negligible</i>	Water conservation techniques will be utilized. Water made available to the park by recent improvements will be productively utilized and fees will not be wasted. Overall effect: Long-term minor adverse
Air Quality	No change to local air quality.	Minor impacts to air quality.

Impact Topic	Alternative A (No Action)	Alternative B – Sustainable Production (Preferred Alternative)
	Overall effect: <i>Negligible</i>	Overall effect: Long-term minor adverse
Socioeconomic Environment	No change to the current socioeconomic environment. Overall effect: <i>Negligible</i>	Increased employment opportunities for local farmers, and revenues for local businesses. Locally produced goods keep revenues in nearby communities. Overall effect: <i>Long-term moderate beneficial</i>

CHAPTER 3 - AFFECTED ENVIRONMENT

INTRODUCTION

This Chapter describes the existing setting or baseline conditions (i.e. affected environment) within the project area. This information will be used to analyze impacts to the current conditions at the site. Resource topics included in this chapter, and analyzed in terms of impacts in the following chapter *Environmental Consequences* include National Historic Landmark, Cultural Landscapes, Archaeological Resources, Park Operations, Visitor Use and Experience, Visual Resources, Topography and Soils, Wildlife, Vegetation, Water Resources, Air Quality, and Socioeconomic Environment.

AFFECTED ENVIRONMENT

National Historic Landmark

Hubbell Trading Post was designated as a National Historic Landmark on December 20, 1960 (NPS 1989, 1961, & 1958, Uteley 1959). National Historic Landmarks are nationally significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States. The quality of national significance is ascribed to districts, sites, buildings, structures, and objects that possess exceptional value or quality in illustrating or interpreting the heritage of the United States in history, architecture, archaeology, technology and culture.

The 160 acre Hubbell homestead was unique in being one of very few parcels of privately owned land claimed and subsequently retained in the Four Corners area during the late nineteenth/early twentieth century, a time during which the Navajo reservation boundaries were expanded.

All National Historic Landmarks are included in the National Register of Historic Places and may be listed under one or more of four significance criteria including Criterion A - association with important events; Criterion B - association with important people; Criterion C - distinctive design or construction; and Criterion D - information potential. HUTR is listed on the National Register of Historic Places under all four significance criteria as a late nineteenth, early-twentieth century trading post complex containing prehistoric and historic sites (NPS 1989).

The nomination form specifies almost all of the 160 acres of Hubbell Trading Post in the National Historic Landmark designation, including the approximately 90-acres of the proposed project site. The only portion not included on the nomination form for National Historic Landmark designation is the parcel north of the Pueblo Colorado Wash (acquired later and not included in original nomination form). Everything south of the Pueblo Colorado Wash, including the agricultural fields, is within the boundaries of the National Historic Landmark.

Beginning in the 1870s, John Lorenzo Hubbell established his homestead and the trading post. He is considered the significant individual associated with the National Historic Landmark because he was one of the most important Navajo traders (Criterion B). Through his interactions with Euro-American travelers, guests and the neighboring Navajo, Hubbell amassed a collection of over 66,000 objects. The extensive trade that he conducted with the Navajo is considered an important activity to the history of the region (Criterion A).

The historic buildings of the Hubbell homestead contribute to the significance of the National Historic Landmark because many are good examples of unique design or engineering (Criterion C). Historic buildings listed on the nomination form include the trading post, a wareroom annex, the Hubbell residence and other residences, a barn, a hogan, a bread oven, a utility building, corrals and sheds, a school, a pumphouse, and a root cellar. All of the historic buildings are part of a historic district, distinct from the historic farm fields and the proposed location for the reintroduction of agriculture. These buildings are currently used for the on-going retail operation of the trading post, for interpretive purposes and adaptive

uses. Visitors are permitted and encouraged to visit/explore those historic buildings that are open and accessible. Certain parts of historic structures and an outbuilding is used to house domestic animals (horses and chickens) kept at the park. These areas can be viewed easily by visitors but not accessed beyond visible barriers.

The irrigation system and fields also contribute to the significance of Hubbell Trading Post as a National Historic Landmark because of their type and method of construction (Criterion C). Constructed in 1902-1908, the irrigation system supplied water to approximately 110 acres of agricultural land, divided into five fields. One of these fields (Ag 1) was designated as the developed zone of the park in 1980 and is not being considered for this project. The other four fields have not recently been cultivated or developed, and have reverted to scrub and patchy vegetation associated with disturbed sites. The other four fields comprise the areas of the park being considered for reintroducing agriculture, which is approximately 90 acres of the 110 acres of agricultural land at the park.

Cultural Landscape

A cultural landscape is defined as a reflection of human adaptation and use of natural resources, and is expressed both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions. To define a cultural landscape, many elements are analyzed including spatial organization, cluster arrangement, circulation, vegetation, land use, response to natural features, cultural traditions, structures, viewsheds, cultural sites, and boundaries. Shaped through time by historical land-use and management practices, as well as politics and property laws, levels of technology, and economic conditions, cultural landscapes provide a living record of an area's past, a visual chronicle of its history.

A Cultural Landscape Report for HUTR was conducted by the National Park Service (NPS 1998). This report concluded that the cultural landscape associated with the Hubbell Trading Post complex is significant in that it comprises one of the most complete assemblages of landscape resources associated with an early Navajo trading post operation. A Cultural Landscape Inventory conducted in 2002 found the Hubbell Trading Post Cultural Landscape to be eligible for listing as a National Register Property under the "site" category and recommended a register nomination be developed for the cultural landscape resources of the park.

Approximately seven areas of the site reflect patterns of land use by the Hubbell family including the agricultural fields/irrigation features; the trading post and Hubbell's residence; the manager's residence/bread ovens/chicken coop/yard area; the barn lot/sheds/corrals; the specialty garden plots; the school house/chapter house (now the visitor center); and the Hubbell Hill (located outside the park boundary). In addition to these areas, the historic circulation patterns, vegetation, cultural traditions, land use, structures, viewsheds, and archaeological resources of the site are contributing elements of the cultural landscape. The cultural landscape of Hubbell Trading Post is eligible for the National Register of Historic Places under all four significance criteria (A, B, C, and D), and is considered an important contributing element to the National Historic Landmark status of the site (NPS 1998).

The existing Hubbell Trading Post landscape reveals the evolution of a rural vernacular landscape through a continuum of use that dates from the last quarter of the nineteenth century to the present day. Agricultural activity occurred between 1903 and the late 1950's. Agricultural reintroduction will be phased into portions of the approximately 90 acres of the original 110 acres farmed at Hubbell Trading Post. Since the cessation of agriculture in the late 1950's, the fields have lost most of their identity and integrity as farm fields. Thus, while the majority of the Hubbell Trading Post complex retains its integrity as a cultural landscape; the abandoned fields of the park no longer reflect the historic setting or the overall cultural landscape identity. The cultural landscape report indicates that only remnants of the original terraces used for farming remain; and with the abandonment of agriculture, the natural community organization has been severely modified as several exotic invasive species have been introduced. Despite these disturbances, the abandoned fields of the park are still considered a contributing element to the cultural landscape.

Archaeological Resources

With the 2002 resurvey of previously recorded archaeological sites, seven National Register eligible archaeological sites have been recorded as being within the existing park boundary and the management responsibility of the National Park Service: HUTR 1, 3, 5, 10,11,14 and 15. HUTR 1 consists of the actual trading post complex, which is not in the project area for this project and has been excluded.

HUTR has been surveyed more opportunistically than systematically over the years since its administration by the NPS (NPS 2002b). Of the actual 18 different sets of cultural remains ranging in date from A.D.1 through the 20th century, eight are clearly not within the boundaries of the park, and therefore NPS has no legal responsibility for their management.

Of the remaining 10, two do not meet Navajo Nation Historic Preservation Department (NNHPD) site criteria and another site was destroyed by archaeological excavations and erosion and no longer exists. This leaves seven sites that are within the boundaries of HUTR that meet NNHPD site criteria and which still exist (NPS 2002b). Two of these sites, HUTR 3 and 5, are now considered parts of a single site. Of these seven sites, only HUTR 11 and 14 occur within the agricultural fields proposed for cultivation.

Park Operations

The maintenance division at HUTR is responsible for ensuring that the grounds and buildings are in good condition. This includes facility repairs and maintenance, preservation maintenance, pest control, minor landscaping, and general housekeeping. Three full-time employees and one subject to furlough employee make up this division. The maintenance shop is located in the developed zone of the park. Members of other divisions, especially Visitor Services are responsible for the care and feeding of the animals kept within the historic district, adjacent to the agricultural fields. The park maintains visiting hours for the public generally from 8:00 AM to 5:00 PM, 6:00 PM from April to October.

Under current conditions, the park will be unable to create any new positions or provide additional funding to current employees for operations. Therefore, it has been proposed that the fields be leased, preferably to an interested community farmer/farmers.

Visitor Use and Experience

Total recreation visits to HUTR for 2001 was estimated at 247,174. HUTR is open year round, except on Thanksgiving, Christmas, and New Year's Days. No fee is charged to visitors, and the average length of stay is less than two hours. Visitors to the park may self-guide themselves through the historic district, shop in the Trading Post and Visitor Center or take a guided program of the Hubbell home. Historic objects including basketry, rugs, framed works-of-art, pottery, furniture, household goods, tools and equipment are displayed as furnishings in the historic structures. Navajo weavers demonstrate their weaving artistry in the visitor center.

The trading post is still an active retail establishment and maintains an inventory of food products, supplies, and artworks such as Native American rugs and jewelry. These items are available for purchase by visitors to the park. Recreational visitors to the trading post commonly purchase food products and Native American artworks. The neighboring Navajo and Hopi primarily visit the trading post to trade or purchase groceries and other supplies.

Visitors generally do not access areas outside the central historic district including the outlying agricultural fields. The fields are not typically visited although there is a trail that circles the fields, but few visitors take advantage of this easy walk along the park perimeter. Visitors are denied access to a significant portion of the historic barn for safety reasons and because it is being used to house domestic animals. However, visitors are able to see into the interior of the barn and can view the animals in the space they occupy.

Twice a year HUTR holds a Native American Arts Auction. During these events, attendees park their vehicles in field Ag 2 immediately southeast of the Visitor Center due to the large attendance. Since this only occurs on two days of the year, the vehicles do not significantly or permanently compact soils in this field.

Visual Resources

The proposed location for the reintroduction of agriculture is flat with a mix of native and exotic “desert scrub” vegetation that has modified the abandoned farm fields. A few of the original elm, cottonwood, and fruit trees remain along the historic irrigation ditches. Since this area was disturbed by farming practices for decades, it will take many years to revert to its pre-disturbance native community organization.

The views of the proposed site for the reintroduction of agriculture, namely the farm fields, from the historic district consist of the flat fields themselves, now spotted with sparse vegetation, remnants of the terraces and the distant vistas beyond. In the foreground, the barn, corrals, the horses, outbuildings and farm implements are all visible as are the historic ditches and stone head gates. In the middle ground is the irrigation reservoir adjacent to the park, and a view of the developed area, partially obscured by trees along the arroyo.

Outside of the park, the view from the fields would include Hubbell Hill, surrounding buttes, a portion of Navajo Route 3 (State Highway 264, paved) and various buildings on the Navajo Nation. Improvements along State Highway 264 in addition to increased accessibility to and within the Ganado area have resulted in increased residential and commercial development on the Navajo Nation. Historically, commercial developments on the reservation were limited to the widely scattered trading post operations, while residential development on the reservation was characterized by dispersed clusters of dwellings and other support structures of large extended families. Today, a variety of service stations, markets, social service complexes (schools, post offices, sewage treatment plants, etc.) and housing projects are located throughout the Navajo Nation, and several are visible from HUTR.

Topography and Soils

The natural terrace on which the project site sits is the most extensive landform in the park. Five historic agricultural fields were established on the high terrace, taking advantage of the fine sandy loams. Each was modified to suit irrigation and drainage.

The soils of HUTR include clays, sandy clay loam, and sandy loam (NPS 1980). Most are deep and dry, with an alluvium parent material. The soil has moderate permeability and runoff is slow. The shortage of “green cover” to bind soils with root colonization has created a soil composition vulnerable to erosion.

Historically, overgrazing of the lands in the Ganado area was prevalent, resulting in severe problems with erosion. Within the park and elsewhere, erosion control measures have been introduced but with the dry, loose nature of the soils, the removal of invasive species and periodic flood events, erosion along the Pueblo Colorado Wash continues to be problem. Although irrigation measures will sequester most of the water within the soils under cultivation, some runoff is inevitable.

Historically, the soils of the farm fields supported a variety of crop plants including alfalfa, rye and corn but with the abandonment of agriculture, exotic species have invaded the fields along with the succession of desert scrub vegetation and several prairie dog communities, which decimate any localized vegetation causing more intense wind erosion.

The kitchen garden, west of the Hubbell home, continues to be cultivated and irrigated annually by National Park Service staff. The soils in this garden are enriched with manure and now support a healthy garden with a variety of vegetable crops.

Wildlife

Bird species typically associated with the scrub and riparian vegetation at HUTR include ravens, swallows, kestrels, hummingbirds, robins, roadrunners, sparrows, hawks, doves, and vultures. Surveys of birds have been conducted in the riparian environment of the Pueblo Colorado Wash within park boundaries and throughout the park as part of the wildlife survey for the NPS Inventory and Monitoring effort. It appears from the high density of birds in the winter months that the area may be important for wintering birds.

The density of small mammals at HUTR is low. This is probably the result of a combination of extreme habitat modification associated with the removal of exotic vegetation in the riparian environment and the change in plant succession due to the alteration of the original vegetation of the farm fields, the extended drought, and presence of small predators in the form of feral house cats, domestic dogs, raccoons, possibly grey fox, long-tailed weasel, and coyote. There are a few active small mammal holes in the area, but virtually no small mammal pathways. It is suspected that the extended drought is the prime cause and that the small mammal population will increase if increased precipitation allows ground level vegetation to recover. Rock squirrels and bats are relatively abundant within the Site. Results from wildlife surveys over the last two years in the majority of the park have not yet been posted but include skunk, mule deer, prairie dog, desert cottontail, black-tailed jackrabbit, white-tailed antelope squirrel, gopher and mice. The vertebrate inventory conducted in 2002 for the Inventory and Monitoring Network of the Southern Colorado Plateau, National Park Service has not yet yielded a report.

Both reptile and amphibian density and diversity are low. Represented in the park are lizards, toads, frogs, turtles, and snakes.

Vegetation

The vegetation present at HUTR is classified as 'Great Basin Microphyll Desert'. The plant communities in the abandoned fields include low shrub-grassland and sagebrush varieties. In the low shrub-grassland communities, dominant grasses include galleta (*Hilaria jamesii*) and alkalai-sacaton (*Sporobolus airoides*). Dominant shrubs include snakeweed (*Gutierrezia sarothrae*) and rabbitbrush (*Chrysothamnus nauseosus*). Tree species include juniper (*Juniperus deppeana*) and cottonwood (*Populus deltoides*). Russian olive (*Eleagnus angustifolia*) and Tamarisk (*Tamarix chinensis*), both introduced species, are being eliminated from the floodplain of the Pueblo Colorado Wash. Prickly pear cactus (*Opuntia* sp.) and wolfberry (*Lycium pallidum*) are present and big sagebrush (*Artemisia tridentata*) dominates the sagebrush communities.

With the abandonment of agriculture in the late 1950's, the plant community distribution in the farmfields changed to a succession resembling the surrounding landscape. Fifty years of disturbance will prevent these lands from ever truly achieving pre-disturbance native plant community composition. According to the 2001 Report of the Biological Inventory at HUTR exotic species invasion is problematic throughout the site. The project site, the old agricultural fields are currently used as pasture for horses and is dominated by exotic annual forbs. Native forbs and grasses are largely absent from these areas. An estimated 50% of the field areas are bare ground with a mixture of native shrubs, the only native perennial left. A few trees are located along the edges and along the old irrigation ditches.

Water Resources

HUTR is located along a reach of the Pueblo Colorado Wash, which contains several significant springs, thereby making this specific reach of the Wash particularly attractive from prehistory to the present day as evidenced by Wide Reed Ruin archaeological site and the original site of the trading post.

The *Baseline Water Quality Data Inventory and Analysis* (NPS 1997) summarizes the results of various database retrievals within the Site. Water quality was analyzed according to pH, conductivity, water temperature and natural dissolved uranium. According to the Environmental Protection Agency (EPA)

water quality criteria analysis of the entire HUTR study area, pH and natural dissolved uranium levels did not exceed standards developed by the EPA. Water temperature and conductivity were also found to be within acceptable limits. The park water quality data falls within the Servicewide Inventory and Monitoring Program's acceptable "Level I" water quality inventory parameters. Level I assessment examines geologic conditions to a depth of about 5 feet below the land surface.

In 1985, the National Park Service filed water rights claims for HUTR in the Little Colorado River (LCR) Adjudication in Arizona. Two claims for state appropriative water rights were filed. The first claim was for a Hubbell Trading Post well for up to 320 gpm, which is used on acquired land within the park and conveyed to Ganado via a pipeline owned by the Navajo Tribal Utility Authority under an agreement with the Navajo Nation. The second claim filed in the Adjudication is for a right to use 363 acre-feet of water from Pueblo Colorado Wash delivered through the Ganado Irrigation Water Conservation Project to irrigate 110 acres within the park. The LCR Decree Court recently confirmed the binding effect of five stipulations on July 16, 2002, signed between the National Park Service and the Abitibi Consolidated Sales Corporation, Arizona Public Service Company, the City of Flagstaff, Salt River Project, and Tucson Electric Power Company, that include recognition of water right attributes for the National Park Service water rights at HUTR. The rights have not been decreed by the LCR Decree Court.

Air Quality

HUTR currently has no threats to its air quality. Section 118 of the Clean Air Act requires a park unit to meet all federal, state, and local air pollution standards. HUTR is designated as a Class II air quality area under the Clean Air Act. A Class II designation indicates the maximum allowable increase in concentrations of pollutants over baseline concentrations of sulfur dioxide and particulate matter as specified in Section 163 of the Clean Air Act.

Socioeconomic Environment

HUTR contributes an important element to the socioeconomic environment of the Ganado community. The hiring of local staff and the local business benefits of the tourist industry are positive effects of the park unit. The trading post provides an accessible market for Navajo rug weavers, jewelers and artists and possesses a reputation for dealing in high quality, authentic Native American arts and crafts. It also provides a social atmosphere where community members and visitors can experience within a retail operation a sense of "the old days" with a slower pace, less technology and more interpersonal interaction. Visitor education and interpretation at the park strives to provide visitors with an appreciation and understanding of Navajo culture and values. Twice a year HUTR holds a Native American Art Auction to help support local artists in a historic setting where Native American arts have long been valued. HUTR has a positive effect on the socioeconomic environment of Ganado by bringing outside revenues into the community in an environmentally benign and culturally reinforcing context.

CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter analyzes the potential environmental consequences, or impacts, that will occur as a result of implementing the proposed project. Topics analyzed in this chapter include National Historic Landmark, Cultural Landscapes, Archaeological Resources, Park Operations, Visitor Use and Experience, Visual Resources, Soils, Wildlife, Vegetation, Water Resources, Air Quality, and Socioeconomic Environment. Direct, indirect, and cumulative effects, as well as impairment are also analyzed for each resource topic. Potential impacts are described in terms of type, context, duration, and intensity, as defined below.

Type

Describes the classification of the impact as either beneficial or adverse, direct or indirect:

Beneficial - A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.

Adverse - A change that moves the resource away from a desired condition or detracts from its appearance or condition.

Direct - An effect that is caused by an action and occurs in the same time and place.

Indirect - An effect that is caused by an action but is later in time or farther removed in distance, but is still reasonably foreseeable.

Context

Describes the area or location in which the impact will occur. Are the effects site-specific, local, regional, or even broader?

Duration

Describes the length of time an effect will occur, either short-term or long-term:

Short-term impacts generally last only during implementation, and the resources resumes their pre-implementation conditions following implementation.

Long-term impacts last beyond the implementation period, and the resources may not resume their pre-construction conditions for a longer period of time following implementation.

Intensity

Describes the degree, level, or strength of an impact. For this analysis, intensity has been categorized into negligible, minor, moderate, and major. Because definitions of intensity vary by resource topic, intensity definitions are provided separately for each impact topic analyzed.

Cumulative Effects

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Policy Act of 1969 (42 USC 4321 et seq.), require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7).

Cumulative impacts were determined by combining the impacts of the Action Alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects at HUTR and, if applicable, the surrounding region. The following projects were identified for the purpose of conducting the cumulative effects analysis, and are listed in order of most to least recent:

Future

- Effluent Project, HUTR, Summer 2003 - This project will consist of installing a temporary irrigation pipe to carry treated effluent from a nearby sewage lagoon to restore the cottonwood canopy of the riparian zone of the Colorado Wash.
- Visitor Center HVAC, HUTR, Summer 2003 - This project will consist of installing the first-ever HVAC system in the Visitor Center. It will be engineered so as not to be a visual intrusion on the cultural landscape. (This project is now in the design phase and will be completed in 2004).
- Construction of a Museum Storage Facility, Summer 2003 - This project consists of constructing a new museum storage facility to provide sufficient storage space for the collection, in addition to employee offices and a laboratory. This construction should be completed in late 2003.
- Roadway Improvements to State Highway 264, Arizona Department of Transportation, Future - This project may take place within the next ten years and would consist of widening State Highway 264, potentially to three to five lanes.
- General Development along State Highway 264 - Continual development along State Highway 264 and on the Navajo Nation has resulted in the construction of buildings and structures that are visible from HUTR.

Present

- Visitor Center and Trading Post Parapet Repair, HUTR, Summer 2002-2003 - This project was a 20% fee demo project that consisted of replacing in kind the deteriorated stone of the historic stone parapet on the Visitor Center. The Trading Post parapet will be treated in the summer of 2003.

Past

- Natural Gas System Replacement, 2002 - This project replaced the antiquated and unsafe natural gas system that services the entire Hubbell historic district.
- Fire Suppression System Replacement, 2002 - This project replaced an outdated fire suppression system for the key historic structures in the cultural landscape.
- Ganado Irrigation Water Conservation Project, Bureau of Reclamation, 2000-present - This project consists of rehabilitating the historic Ganado Irrigation System located within the Ganado Chapter of the Navajo Nation.
- Bridge Replacement, HUTR, 2000 This emergency project consisted of replacing the non-historic bridge over the tributary to the Pueblo Colorado Wash near the entrance of the park. Design of bridge was purposefully simple, rustic, and compatible with cultural landscape.
- Historic Hubbell Barn Stabilization, 2000 - This project provided emergency structural stabilization of the 100 year-old historic two-story barn in the Hubbell homestead.

- Housing Construction, HUTR, 1995-1997 - Ten new employee houses were added to the development area and the trailers along the entrance road were removed.

Impairment

National Park Service's Management Policies, 2001 require analysis of potential effects to determine whether or not actions would impair park resources (NPS 2000b). The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. National Park Service managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values. However, the laws do give the National Park Service the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values.

Although Congress has given the National Park Service the management discretion to allow certain impacts within park, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values. An impact to any park resource or value may constitute an impairment, but an impact would be more likely to constitute an impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park; or
- identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impairment may result from National Park Service activities in managing the park, visitor activities, or activities undertaken by concessionaires, contractors, and others operating in the park.

NATIONAL HISTORIC LANDMARK

Intensity Level Definitions

For purposes of analyzing potential impacts to the National Historic Landmark of Hubbell Trading Post, the thresholds of change for the intensity of an impact are defined as follows:

Negligible: Impact(s) is at the lowest levels of detection - barely perceptible and not measurable. For purposes of §106, the determination of effect would be *no adverse effect*.

Minor: Adverse: Disturbance of a historic property results in little, if any, loss of significance or integrity and the National Register eligibility of the property is unaffected. For purposes of §106, the determination of effect would be *no adverse effect*.

Beneficial: The historic property is maintained/preserved. For purposes of §106, the determination of effect would be *no adverse effect*.

Moderate: Adverse: The impact would alter a character defining feature of the historic property, but would not diminish the integrity of the property to the extent that its National Register eligibility is jeopardized. For purposes of §106, the determination of effect would be *no adverse effect*.

Beneficial: The historic property is maintained/preserved. For purposes of §106, the determination of effect would be *no adverse effect*.

Major: Adverse: The impact would diminish the significance and integrity of the property to the extent that it is no longer eligible to be listed in the National Register. For purposes of §106, the determination of effect would be *adverse effect*.

Beneficial: The action includes active intervention to preserve the site. For purposes of §106, the determination of effect would be *no adverse effect*.

Impairment: A major, adverse impact to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of HUTR; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents.

Impacts to the National Historic Landmark status for Alternative A (No Action Alternative)

Direct/Indirect Impacts - The impacts of no action on the National Historic Landmark topic are described in more detail below.

- No crops would be introduced to the agricultural fields therefore effects to this contributing element of the National Historic Landmark would be moderate and adverse since erosion and deterioration of the terraces would continue.
- Weeds and exotic species will continue to be unabated, and the fields would be subject to continued invasion by all sorts of non-native and noxious weeds.
- Topographic alterations would not occur and the historic terraces as a character-defining feature of the farm fields would continue to deteriorate.
- Education and interpretation would continue to focus on other aspects of the National Historic Landmark and will not provide a comprehensive story of a major aspect of the Hubbell homestead, the farming operation.

The No Action Alternative would result in negligible to minor direct adverse impacts to Hubbell Trading Post as a National Historic Landmark. Historic structures that contribute to the significance of the National Historic Landmark would not be affected. However, due to the abandonment and current erosion of the historic terraces, potential moderate indirect adverse impacts would result from continued deterioration of these historic features of the landscape, which are a contributing element of the National Historic Landmark.

Cumulative Effects - The proposed reintroduction of agriculture is located in 90 of the 110 acres farmed from the turn of the century until the late 1950's, when they were abandoned. Park residences, maintenance buildings, storage units and the new museum storage facility are clustered in the developed zone (Ag5) of the park, resulting in the loss of this one historic agricultural field, which comprised only a small percentage of the entire network of agricultural fields. Remnants of the irrigation head gates still remain in the developed zone, but little evidence of the terracing and farm fields remains. Therefore, although the decision to establish the developed zone in the park in 1980 removed portions of the historic agricultural fields, the majority of these historic agricultural fields still remain, and the historic land use will not change.

Other park projects such as the barn stabilization, the repair of the parapets of the visitor center and trading post and the installation of an HVAC system in the visitor center are designed to improve the park's historic structures and will not affect the historic agricultural fields.

Therefore, the impacts of the No Action Alternative in addition to the impacts of other past, present, and reasonably foreseeable future actions would result in overall minor adverse effect to the National Historic Landmark.

Conclusion - The No Action Alternative would result in overall minor to moderate indirect adverse impacts to the National Historic Landmark as a result of the continuing deterioration of the historic terraces. Cumulatively, the No Action Alternative in addition to the various planned preservation and restoration projects for the park's historic buildings and structures would result in minor to moderate adverse effects to the National Historic Landmark. There would be no impairment of the park's resources or values.

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.2, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of the Alternative A would have *no adverse effect* on the National Historic Landmark or contributing features the National Historic Landmark of Hubbell Trading Post.

Impacts to the National Historic Landmark status for Alternative B (Preferred Alternative)

Direct/Indirect Impacts - The various components of the Preferred Alternative identified as irrigation, grazing, work force, equipment, soil amendments, fencing, implementation and monitoring will have negligible effects on the National Historic Landmark since there will be no change from the existing state. Crop type, weed control, topographic alterations, education and interpretation will have effects on the National Historic Landmark as described in more detail below.

The effect of the Preferred Alternative on the National Historic Landmark is expected to have a minor to moderate beneficial impact because sustainable production for the reintroduction of agriculture will reinforce the historic terraces and help prevent their erosion. The Preferred Alternative will not remove or alter any historic structures, such as the irrigation checks and ditches. Therefore, the Preferred Alternative will have a minor beneficial impact because it will reinforce and preserve historic features within the National Historic Landmark. The binding of soils by root crops will help prevent erosion. Further, mitigation measures are designed to lessen the impact of introducing a new irrigation system into a National Historic Landmark, including the preservation of the historic irrigation checks and ditches.

All ground disturbing activities related to the reintroduction of agriculture will occur within the Hubbell fields. The Animal Management Plan for HUTR (NPS 1999b) found that the impact of the current level of five horses, maintained to enhance the cultural landscape, on the historic corrals was negligible. Under this alternative, the presence of draft animals, at the same minimal number of five or less (as stated in the Animal Management Plan) would also have a negligible to minor impact on historic structures, namely the barn and corrals. The use of modern farm equipment such as tractors and combines, which can potentially create noise and vibrations, may present a minor to moderate adverse impact on historic structures associated with the National Historic Landmark. The decision to utilize modern equipment and implements could compromise the historic character of the fields as a result of their visual presence from the historic complex. The Preferred Alternative would also allow the use of draft animals, which would avoid these potential minor impacts. Nevertheless, if modern equipment and implements are utilized these potential impacts will need to be considered. If the farmer decides to utilize low-impact, clean technology, there is the potential for negligible to minor negative impact to historic buildings from noise and vibrations.

Cumulative Effects - The proposed location for the reintroduction of agriculture is located in 90 of the original cultivated 110 acres. These fields have reverted back to scrubland since they were abandoned in the late 1950's. Construction of residences, maintenance buildings, and the new museum storage facility over the years have resulted in the removal of the historic agricultural fields in the developed zone. Remnants of the irrigation ditch still remain in the developed zone, but little evidence of the terracing and farm fields remains. The Ganado Irrigation Water Conservation Project will improve portions of the historic irrigation head gates located outside the park. Therefore, although the establishment of the

developed zone in the park removed portions of the historic agricultural fields, the majority of these fields lie outside the developed zone and will be improved over time with the reintroduction of cover crops or cultivated field and the resulting aesthetic benefits to the cultural landscape. Other projects scheduled to occur in the near future or which have already occurred, such as barn stabilization, parapet repair to the visitors center, and construction of a museum storage facility are designed to maintain the park in a good condition through various preservation and restoration techniques.

In light of this, the negligible to minor adverse impacts to the National Historic Landmark from the introduction of livestock and draft animals to the fields and historic corrals of the park or the use of clean, low-input technologies, or the minor to moderate adverse impacts from the use of higher impact modern technologies would be minimized because of the greater improvements to other portions of the National Historic Landmark. The Preferred Alternative will also have a minor to moderate beneficial impact on the historic terraces, which are an important element of the National Historic Landmark. Therefore, the impacts of the Preferred Alternative in addition to the impacts of other past, present, and reasonably foreseeable future actions would result in overall minor beneficial effect to the National Historic Landmark.

Conclusion - The Preferred Alternative would result in minor to moderate beneficial impacts as a result of reinforcing the historic terraces at the National Historic Landmark and protecting the historic irrigation checks and ditches. Potential negligible to minor adverse impacts could also occur to the historic structures from activities associated with livestock, draft animals, and low-impact technologies. Potential minor to moderate adverse impacts could occur from the use of higher impact technologies. Cumulatively, the Preferred Alternative, in addition to the various planned preservation and restoration projects for the park's historic buildings and structures would result in minor beneficial effects to the National Historic Landmark. There would be no impairment of the park's resources or values.

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.2, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of the Alternative A would have *no adverse effect* on the National Historic Landmark or contributing features of the National Historic Landmark of Hubbell Trading Post.

CULTURAL LANDSCAPES

Intensity Level Definitions

Cultural landscapes are the result of the long interaction between people and the land, the influence of human beliefs and actions over time upon the natural landscape. Shaped through time by historical land-use and management practices, as well as politics and property laws, levels of technology, and economic conditions, cultural landscapes provide a living record of an area's past, a visual chronicle of its history. The dynamic nature of modern human life, however, contributes to the continual reshaping of cultural landscapes; making them a good source of information about specific times and places, but at the same time rendering their long-term preservation a challenge.

For purposes of analyzing potential impacts to the cultural landscape of HUTR, the thresholds of change for the intensity of an impact are defined as follows:

Negligible: Impact(s) is at the lowest levels of detection - barely perceptible and not measurable. For purposes of §106, the determination of effect would be *no adverse effect*.

Minor: Adverse: The impact would not affect a character defining pattern(s) or feature(s) of a National Register of Historic Places eligible or listed cultural landscape. For purposes of §106, the determination of effect would be *no adverse effect*.

Beneficial: The result is preservation of character defining patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. For purposes of §106, the determination of effect would be *no adverse effect*.

Moderate: Adverse: The impact would alter a character defining pattern (s) or feature(s) of the cultural landscape but would not diminish the integrity of the landscape to the extent that its National Register eligibility is jeopardized. For purposes of §106, the determination of effect would be *no adverse effect*.

Beneficial: The result is rehabilitation of a landscape or its patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. For purposes of §106, the determination of effect would be *no adverse effect*.

Major: Adverse: The impact would alter a character defining pattern(s) or feature(s) of the cultural landscape to the extent that it is no longer eligible to be listed in the National Register. For purposes of §106, the determination of effect would be *adverse effect*.

Beneficial: The result is restoration of a landscape or its patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. For purposes of §106, the determination of effect would be *no adverse effect*.

Impairment: A major, adverse impact to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of (park name); (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents.

Impacts to the Cultural Landscape for Alternative A (No Action Alternative)

Direct/Indirect Impacts: The impacts of no action on the Cultural Landscapes topic are described in more detail below.

- No crops would be introduced to the agricultural fields therefore impacts to the cultural landscape would be direct, long-term and adverse since the condition of the farmfields, a defining feature of the cultural landscape, would not be improved.
- Since irrigation of the fields would not occur despite water being available through the Ganado Irrigation Water Conservation project, impacts would be direct, long-term and adverse.
- Grazing of livestock will consist of the incidental animals currently maintained at the park to enrich the cultural landscape. Impacts to the cultural landscape would be direct, long-term and adverse since additional livestock would add to the ambience of the cultural landscape.
- A work arrangement with a local farmer/farmers to cultivate the fields of the cultural landscape would be unnecessary since the fields would remain in their present uncultivated state. Impacts to the cultural landscape would be indirect, long-term and adverse since the efforts of a farmer tilling the soil and cultivating crops would realize improvements to the cultural landscape.
- No farm equipment would be required or used in the farm fields; therefore impacts to the cultural landscape would be indirect, long-term and adverse since the use of farm equipment in the agricultural fields would enhance the cultural landscape.
- Weed control will continue to be unabated, and the fields would be subject to continued exotic species invasion. Impacts to the cultural landscape would be direct, long-term and adverse since the mixed scrub vegetation now existing in the farm fields will be subject to additional exotic species invasion.

- Soil amendments will not be utilized. Impacts to the cultural landscape would be indirect, long-term and adverse since these nutrients would benefit the farmfields of the cultural landscape.
- Topographic alterations would not occur and the historic terraces as a character-defining feature of the farm fields would continue to deteriorate. Impacts to the cultural landscape would be long-term, direct and adverse since dimensions, grade and layout of original terraced fields are being lost.
- Education and interpretation of the cultural landscape would be minimized since education and interpretation would continue to focus on other aspects of the National Historic Site and would not provide a comprehensive story of a major aspect of the Hubbell homestead, resulting in a minor adverse impact.

Cumulative Effects - The proposed location for the reintroduction of agriculture is located in 90 of the 110 acres farmed from the turn of the century until the late 1950's, when they were abandoned. Construction of residences, maintenance buildings, and storage units over the years have resulted in the removal of the historic agricultural fields in the developed zone. Remnants of the irrigation head gates still remain in the developed zone, but little evidence of the terracing and farm fields remains. Projects such as the Ganado Irrigation Water Conservation Project will improve portions of the historic irrigation system located outside the park regardless of the park's decision. Therefore, although the establishment of the developed zone in the park removed portions of the historic agricultural fields, the majority of these fields lie outside the developed zone. Other projects scheduled to occur in the near future or which have already occurred, such as barn stabilization, the parapet repair to the visitors center, and the construction of new museum storage facility are designed to maintain the park in a good condition through various preservation and restoration techniques.

In light of this, the moderate adverse impacts to the cultural landscape from disuse and erosion anticipated under the No Action Alternative would be minimized because of the greater improvements to other portions of the National Historic Landmark. Therefore, the impacts of the No Action Alternative in addition to the impacts of other past, present, and reasonably foreseeable future actions would result in overall minor to moderate adverse effects to the cultural landscape.

Conclusion - The No Action Alternative would result in moderate adverse impacts to the cultural landscape as a result of continuing disuse of the farm fields. Cumulatively, the No Action Alternative in addition to the various planned preservation and restoration projects for the park's historic buildings and structures would result in minor to moderate adverse effects to the National Historic Site. There would be no impairment of the park's resources or values.

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.2, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of the Alternative A would have *no adverse effect* on the National Historic Landmark or contributing features to the cultural landscape of HUTR.

Impacts of Alternative B (Preferred Alternative)

The Preferred Alternative is expected to have moderate beneficial impacts on the cultural landscape of HUTR because it will reintroduce agricultural and grazing practices within the cultural landscape. Further, the Preferred Alternative will not physically remove or alter any historic structures such as the irrigation checks and ditches or corrals. By reconstructing the physical landscape in the historic fields with a diversified crop mix, the Preferred Alternative will restore characteristics associated with the cultural landscape including spatial organization, cluster arrangement, livestock grazing, vegetation, land use, response to natural features, cultural traditions, cultural sites, and boundaries, while providing the flexibility to deal with the modern concerns of water conservation and environmental integrity. Mitigation measures are designed to lessen the impact of introducing a new irrigation system into a cultural landscape.

The Preferred Alternative will provide an interpretation of farming and grazing in the Hubbell fields, which is an important element of the historic setting and cultural landscape. This cultivation of the historic fields will result in a moderate beneficial effect to cultural landscape. The potential presence of sheep and cattle will contribute to the cultural landscape as they were historically grazed in the fields. The potential use of draft animals will contribute more to the cultural landscape than modern technologies.

All ground disturbing activities related to the reintroduction of a sustainable production agriculture will occur within the Hubbell fields where ground disturbance related to cultivation occurred in the past. The Animal Management Plan for HUTR (NPS 1999b) declared the impact of horses on the historic corrals as negligible. Therefore the presence of livestock and the use of draft animals for plowing would also have a negligible to minor impact on historic structures. If the farmer decides to utilize low-impact, clean technology, there is the potential for negligible to minor negative impact to historic buildings from noise and vibrations. The use of higher impact technology would create the potential for minor to moderate negative impact to these structures.

Mitigation measures, including the monitoring of these activities by park staff, are designed to minimize potential damage to historic buildings, structures, and objects from occurring. Any damage that does occur to historic buildings, structures, and objects will be repaired in accordance with *Secretary of the Interior's Standards for the Treatment of Historic Properties*.

Cumulative Effects - The proposed location for sustainable production for the reintroduction of agriculture is located in 90 of the original 110 acres farmed, which have reverted back to scrubland since the fields were abandoned in the late 1950's. Construction of residences, maintenance buildings, and storage units over the years have resulted in the removal of the historic agricultural fields in the developed zone, which comprise only a small percentage of the entire network of agricultural fields. Remnants of the irrigation head gates still remain in the developed zone, but little evidence of the terracing and farm fields remains. Projects such as the Ganado Irrigation Water Conservation Project will improve portions of the historic irrigation ditch system outside the park. Therefore, although the establishment of the developed zone in the park removed portions of the historic agricultural fields, the majority of these fields lies outside the developed zone and will be improved over time with sustainable production reintroduction. Other projects scheduled to occur in the near future or which have already occurred, such as barn stabilization, parapet repair to the visitors center, and construction of a museum storage facility are designed to maintain the park in a good condition through various preservation and restoration techniques.

In light of this, the moderate beneficial impacts to the cultural landscape from a sustainable production for the reintroduction of agriculture would be further augmented because of improvements to other portions of the cultural landscape. The Preferred Alternative will also improve the historic terraces, which are an important element of the cultural landscape. Therefore, the impacts of the Preferred Alternative in addition to the impacts of other past, present, and reasonably foreseeable future actions would result in overall moderate beneficial effect to the cultural landscape.

Conclusion - The Preferred Alternative would result in moderate beneficial impacts as a result of the reintroduction of agriculture to the cultural landscape at HUTR. Potential minor adverse impacts could also occur to the historic buildings, structures, and objects from activities associated with livestock, draft animals and low-impact technology. Cumulatively, the Preferred Alternative, in addition to the various planned preservation and restoration projects for the park's historic buildings and structures would result in moderate beneficial effects to the cultural landscape. There would be no impairment of the park's resources or values.

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.2, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of Alternative B (preferred alternative) would have *no adverse effect* on the National Historic Landmark or contributing features to the Cultural Landscape of HUTR.

ARCHAEOLOGICAL RESOURCES

Intensity Level Definitions

Certain important research questions about human history can only be answered by the actual physical material of cultural resources. Archaeological resources have the potential to answer, in whole or in part, such research questions. An archaeological site(s) can be eligible to be listed in the National Register of Historic Places if the site(s) has yielded, or may be likely to yield, information important in prehistory or history. An archaeological site(s) can be nominated to the National Register in one of three historic contexts or level of significance: local, state, or national (see National Register Bulletin #15, *How to Apply the National Register Criteria for Evaluation*). For purposes of analyzing impacts to archaeological resources, thresholds of change for the intensity of an impact are based upon the potential of the site(s) to yield information important in prehistory or history, as well as the probable historic context of the affected site(s):

- Negligible:** The impact is at the lowest levels of detection - barely measurable with no perceptible consequences to archaeological resources.
- Minor:** The impact affects an archaeological site(s) with little or no potential to yield information important in prehistory or history. These archaeological resources are generally ineligible to be listed in the National Register.
- Moderate:** The impact affects an archaeological site(s) with the potential to yield information important in prehistory or history. The historic context of the affected site(s) would be local or state.
- Major:** The impact affects an archaeological site(s) with the potential to yield important information about human history or prehistory. The historic context of the affected site(s) would be national.
- Impairment:** A major, adverse impact to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of HUTR; (2) key to the natural or cultural integrity of the National Historic Site; or (3) identified as a goal in National Park Service planning documents.

Impacts of Alternative A (No Action)

There would be no direct impact to archaeological resources other than a negligible indirect impact resulting from erosion occurring in the uncultivated fields. Erosion is a factor that results in undesirable exposure and degradation of the archaeological sites in the park. This is a natural and predictable process in the arid Southwest.

Cumulative Effects - Archaeological resources at HUTR are subject to damage from vandalism, visitor access, and natural processes

In light of this, the negligible adverse impacts to archaeological resources due to erosion under the No Action Alternative would not be affected by other actions within the park. Therefore, the impacts of the No Action Alternative would result in overall negligible adverse impacts to the archaeological resources.

Conclusion - The No Action Alternative would result in negligible adverse impacts to the archaeological resources as a result of erosion. There would be no impairment of the park's resources or values.

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.2, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of the Alternative A would have *no adverse effect* on the National Historic Landmark or contributing features to the archaeological resources of HUTR.

Impacts of Alternative B (Preferred Alternative)

Negligible to minor direct adverse impact to archaeological resources would result from implementation of Alternative B (Preferred Alternative). HUTR Sites 1, 3, 5, 10, 11, 14, and 15 are located inside the historic site boundary, meet site criteria, are NRHP-eligible and still exist. Of these recorded sites, only 11 and 14 lie within the agricultural fields. Farming and irrigation activities will have to avoid these identified sensitive surface archaeological areas or the intact subsurface artifacts/features. The above resurvey found that cultural remains in the upper 25 cm of farmlands are likely no longer in situ, moved by historic and modern farming activity (NPS 2002a). Therefore, reintroducing agriculture to the previously farmed acres should not disturb any undiscovered remains. The resurvey speculated that intact resources may be found 25-90 cm below the surface. Since this is beyond the depth of agricultural intrusion, the impact should be negligible. Nevertheless, fencing of these identified sites will prevent any impacts. Negligible to minor indirect beneficial impact might result from erosion reduction resulting from soil-building of surrounding soils as root crops take hold.

Cumulative Effects - Other projects scheduled to occur at the National Historic Site, such as the construction of a Museum Storage Facility, pose no threat, as no archaeological sites were identified in the immediate project area (Zimmerman 2002). The report identifies that archaeological resources may be present adjacent to the project areas, and/or subsurface cultural materials may exist in the project areas. For these reasons, a professional cultural resource specialist will monitor all ground-disturbing activities related to construction of the museum storage facility and other projects that may occur. Because the project will not disturb any known archaeological sites, the cumulative impact of the project on archaeological resources is expected to be negligible.

In light of this, the negligible impacts to archaeological resources due to avoidance under the Preferred Alternative would not be affected by other actions within the park. Therefore, the impacts of the Preferred Alternative would result in overall negligible impacts to the archaeological resources.

Conclusion - The Preferred Alternative would result in negligible impacts to the archaeological resources as a result of previous agricultural activity, past excavation tests and site stabilization measures. There would be no impairment of the park's resources or values.

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.2, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of Alternative B (preferred alternative) would have *no adverse effect* on the National Historic Landmark or contributing features to the Archaeological Resources of HUTR.

PARK OPERATIONS

Intensity Level Definitions

Implementation of a project can change the operations of a park. A project may affect the number of employees needed at the park; the type of duties that need to be conducted; when/who will conduct these duties; how activities should be conducted; and administrative procedures. The methodology used to assess potential changes to park operations are defined as follows:

Negligible: Park operations would not be affected or the effect would be at or below the lower levels of detection, and would not have an appreciable effect on park operations.

Minor: The effect would be detectable, but would be of a magnitude that would not have an appreciable adverse or beneficial effect on park operations. If mitigation were needed to offset adverse effects, it would be relatively simple and successful.

Moderate: The effects would be readily apparent and would result in a substantial adverse or beneficial change in park operations in a manner noticeable to staff and the public. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.

Major: The effects would be readily apparent and would result in a substantial adverse or beneficial change in park operations in a manner noticeable to staff and the public, and be markedly different from existing operations. Mitigation measures to offset adverse effects would be needed, could be expensive, and their success could not be guaranteed.

Impacts of Alternative A (No Action Alternative)

The No Action Alternative will not change current park operations at HUTR. All staff will continue to be responsible for their respective duties. As there will be no farming activities reintroduced, issues concerning park operations and staff responsibilities, will not be addressed. Because there will be no change to park operations, the No Action Alternative will have a negligible effect on park operations.

Cumulative Effects - Overall, the majority of past, present, and reasonably foreseeable future projects will have negligible impacts on long-term park operations because additional employees will not be needed for these projects; administrative procedures for the park will not be affected; and the duties of employees will not be altered. However, during implementation of any project, park employees may be temporarily affected to a minor adverse degree because of additional duties such as monitoring the start-up of a project or advising cooperators/contractors, but these additional duties will be eliminated following implementation. Cumulatively, these effects are negligible.

Conclusion - The No Action Alternative will have a negligible impact because there would be no change to existing park operations. Cumulatively, the No Action Alternative combined with other past, present, and reasonably foreseeable future projects will result in negligible to minor adverse impacts to park operations, primarily due to the additional, temporary duties that park employees may incur.

Impacts of Alternative B (Preferred Alternative)

The Preferred Alternative will have a minimal effect upon park operations, which will result in a minor adverse effect. It is not possible for the park to hire additional park employees, nor will additional hours be allotted to current employees. The leasing of the fields to a community farmer/farmers will result in a necessary additional labor force within the Park, which will be the responsibility of the leasee. A farm plan will detail the farmer responsibilities, project implementation and conditions for the sustainable production reintroduction. Park employees may be needed to temporarily monitor operations within the fields and to answer questions concerning the conditions. Nevertheless, these duties will be minimal and should decrease with time.

The farming process is one of uncertainty and change. The working hours and tasks involved with successful farming do not necessarily correspond to a regular or consistent schedule. Therefore, it will be necessary for HUTR to allow access to the agricultural fields during off-hours according to the farmers' needs. The farm plan will deal with these issues and other operational considerations in more detail.

A sustainable production for the reintroduction of agriculture at HUTR will involve minor changes in providing access to the fields, storage of farm implements, additional livestock, irrigation management, etc. The farm plan will deal with these logistical details and Park employees will need to be involved in determining these operations. For safety and preservation issues, certain objects within the field and corral areas will need to be moved and/or stored. These tasks will be temporary during the implementation stages and will therefore not be long-term issues.

The implementation of the new irrigation system will have a minor effect on the park operations. The farmer will initially consult with the Bureau of Reclamation and Navajo Nation Department of Water Resources regarding operation of the irrigation system. The farmer, along with the National Park Service will also need to be involved with the Ganado Water Users Association, the community based

organization that manages the irrigation delivery. Although Park employees will not have a hands-on role in the irrigation process, the National Park Service is responsible for use of its allotted water and will monitor the irrigation process especially during start-up of the project.

Cumulative Effects - Overall, the majority of past, present, and reasonably foreseeable future projects will have negligible impacts on long-term park operations because additional employees will not be needed for these projects; administrative procedures for the park will not be affected; and the duties of employees will not be altered. However, during implementation of these projects, park employees may be temporarily affected to a minor adverse degree because of additional duties such as monitoring the construction or implementation, but these additional duties will be diminished following construction/implementation. The Preferred Alternative is expected to have a temporary, minor, adverse effect on park operations because it will require commitments of the park superintendent and maintenance division during the implementation of this project. Cumulatively, the temporary, minor, adverse effects of the Preferred Alternative in addition to the temporary, minor, adverse effects to employees during implementation of other past, present, and reasonably foreseeable future will result in temporary, minor, adverse impacts to park operations during implementation of this project.

Conclusion - The Preferred Alternative will result in a short-term, minor, adverse impact to park operations diminishing to a long-term negligible effect as the farmer assumes all responsibilities. Short-term, minor, adverse effects to park operations will occur from time to time as the superintendent and maintenance division are needed to supervise and assist with implementing agriculture and monitoring adherence to the farm plan. Cumulatively, the Preferred Alternative in addition to other past, present, and reasonably foreseeable future projects will result in short-term, minor, adverse impacts to park operations particularly during implementation and diminishing with time.

VISITOR USE AND EXPERIENCE

Intensity Level Definitions

HUTR was established to preserve and protect the historic Hubbell complex for the benefit and enjoyment of the public. The methodology used for assessing impacts to visitor use and experience is based on how the agricultural fields are interpreted and incorporated into the overall visitor experience, and how the reintroduction of agriculture would affect the visitor. The thresholds for this impact assessment are as follows:

- Negligible:** Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. Any effects would be short-term. The visitor would not likely be aware of the effects associated with the alternative.
- Minor:** Changes in visitor use and/or experience would be detectable, although the changes would be slight and likely short-term. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.
- Moderate:** Changes in visitor use and/or experience would be readily apparent and likely long-term. The visitor would be aware of the effects associated with the alternative, and would likely be able to express an opinion about the changes.
- Major:** Changes in visitor use and/or experience would be readily apparent and have substantial long-term consequences. The visitor would be aware of the effects associated with the alternative, and would likely express a strong opinion about the changes.

Impacts of Alternative A (No Action Alternative)

The No Action Alternative would not change the current interpretation of the Site. The cultural landscape, in which the Hubbell fields are an integral part, would continue to be inadequately interpreted, thereby limiting the visitor experience. The potential visual experience of a thriving agricultural/pastoral landscape would not be available to the visitor. The visitor will be unable to witness the context and historic role of agriculture in supporting the trading post.

Cumulative Effects - Other past, present, and reasonably foreseeable future actions such as improvements to historic structures in the central historic district (parapet repair and HVAC installation in the visitor center, barn stabilization, and fire system replacement) will provide historic preservation treatment as well as aesthetic, comfort, and safety enhancements for the visitor, which will result in long-term, minor, beneficial effects to visitor use and experience. Cumulatively, the minor, beneficial effects of improvements to historic buildings will help minimize the minor, adverse effects associated with the No Action Alternative.

Conclusion - The No Action Alternative will result in negligible to minor, adverse impacts to visitor use and experience due to the unrealized aesthetic potential of visitors experiencing the full cultural landscape of the Hubbell fields.

Impacts of Alternative B (Preferred Alternative)

The Preferred Alternative would result in long-term, moderate beneficial effects to the visitor use and experience of HUTR because the use of sustainable production for the reintroduction of agriculture would allow the visitor to experience the Hubbell fields in a cultivated context but with the primary goal of contributing to the contemporary agricultural economy and sustainability of the community. The aesthetic benefits of an agricultural/pastoral landscape would enhance the cultural landscape, allow interpreters to explain the community partnership in reintroducing sustainable agriculture and allow the visitor to better conceptualize the role that agriculture played in supporting a trading post.

The cultivation of locally-adapted crops in an environmentally sound context will allow the visitor to witness the application of contemporary sustainable agriculture methods utilized to grow both traditional and niche-market crops in a subsistence agricultural economy. Also, the presence of sheep and other livestock will add to the enjoyment that the resident animals bring to the visitors. Sheep will provide a direct link to weaving, the trade of Navajo rugs in the trading post and the demonstration weaving in the Visitor Center. The presence of fruit trees will provide shade and an aesthetically pleasing landscape.

The use and presence of demonstration gardens and educational programs will also improve the visitor experience. The participation of community individuals, schools and organizations will provide a window into the role of contemporary agriculture in providing a more environmentally sound, culturally appropriate and economically feasible model, demonstrating the continuing link of HUTR to the past while still serving as an economic and social hub of the Ganado community. The sustainable production mix will create a more visually variable experience than a monoculture production. The witnessing of a fully functional agricultural/pastoral system will allow the visitor a stimulating and authentic experience.

The potential for integrating agricultural products into the trading post and/or creating a seasonal farmer's market on-site or within the community could also enhance the visitor experience. Fresh produce for sale would demonstrate the "fruits of labor" to the visiting public while the farmer(s) would be able to market their goods without transportation costs.

The use of a sustainable production mix for the reintroduction of agriculture will result in short-term, negligible to minor effects to visitor use and experience because of fugitive dust created by either mechanized or draft animal plowing. This impact will be greater if the mechanized option is utilized. Nevertheless, this activity will only occur during a short phase of the farming cycle and the dust created should stay fairly localized within the agricultural area.

Cumulative Effects - Other past, present, and reasonably foreseeable future actions such as improvements to historic structures in the central historic district (parapet repair and HVAC to the visitor center, barn stabilization, and fire system replacement) will provide aesthetic, comfort, and safety enhancements for the visitor, which will result in long-term, minor, beneficial effects to visitor use and experience. The Preferred Alternative will improve visitor use and experience to a moderate degree by creating a diverse, vital cultural landscape that would have great aesthetic value and considerable interpretive potential. The reintroduction of agriculture in sustainable production will impact visitor use and experience to a short-term, minor, adverse degree due to fugitive dust. These minor, short-term, adverse effects will be offset by minor, long-term, beneficial effects of the improvements to historic structures. Cumulatively, the moderate, beneficial effects of reintroducing agriculture in addition to these minor effects of the Preferred Alternative will result in long-term, moderate, beneficial effects to visitor use and experience.

Conclusion - The Preferred Alternative will result in long-term, moderate, beneficial effects to visitor use and experience for a number of reasons including an improved cultural landscape; improved aesthetics; and a better understanding of the linkages between the trading post and the agricultural fields. The Preferred Alternative will also result in temporary, short-term, minor, adverse impacts as a result of fugitive dust during a short period of the farming cycle. Cumulatively, the Preferred Alternative, in addition to other past, present, and reasonably foreseeable future actions will have long-term, moderate, beneficial effects to visitor use and experience.

VISUAL RESOURCES

Intensity Level Definitions

Preservation of visual resources is important to retaining the historic setting/feeling and visitor experience at HUTR. The rural and historic characters of the landscape are key elements in the visual setting at the park. The methodology for assessing impacts to visual resources has been established based on these key elements, and is defined as follows:

- Negligible:** The impact to visual resources is at the lowest levels of detection, barely perceptible and not measurable.
- Minor:** The impact to visual resources would be noticeable, but would not alter the feeling, character, or setting associated with the viewshed of or from the park.
- Moderate:** The impact to visual resources would be more noticeable, and may alter the feeling, character, or setting associated with the viewshed of or from the park.
- Major:** The impact to visual resources would be readily apparent, and would alter the feeling, character, or setting associated with the viewshed of or from the park.
- Impairment:** A major, adverse impact to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of (park name); (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents.

Impacts of Alternative A (No Action Alternative)

The No Action Alternative will have negligible effects to visual resources because the existing conditions would not change. Agriculture would not be reintroduced, and this area would remain an arid scrubland as it currently exists, thereby not affecting the existing visual setting.

Cumulative Effects - Development along State Highway 264 and on the Navajo Nation has resulted in the construction of buildings and structures that are visible from HUTR. The introduction of new buildings in the developed zone has had a minor to moderate, adverse effect to the Site's historic setting and natural night sky. Other projects including preservation treatment of historic structures within the Site (barn stabilization and parapet repair to the visitor center) will enhance the visual setting of the historic district to a minor degree. The construction of a museum storage facility will have negligible effects, as it will occur in the developed area beyond the viewshed from the historic district. Cumulatively, the negligible effects of the No Action Alternative, in addition to the minor beneficial effects of preservation treatment within the Site and the development on the Navajo Nation outside the park and the negligible adverse effects of the museum storage facility, will result in a combined negligible effect on the visual resources and historic setting at HUTR.

Conclusion - The No Action Alternative will result in negligible effects to the visual resources of HUTR because agriculture would not be reintroduced historic or not. Cumulatively, the No Action Alternative in addition to other past, present, and reasonably foreseeable future projects will have a negligible effect on the visual resources of the park. There would be no impairment of the park's resources or values.

Impacts of Alternative B (Preferred Alternative)

The proposed location for the reintroduction of agriculture in a sustainable production mix is on the historically farmed acreage of HUTR. As these soils have been previously disturbed, these actions will not affect the natural setting of this area, yet they will considerably change their appearance. The agricultural fields are located in the viewshed of the historic district. Therefore, the Preferred Alternative will have moderate beneficial impacts to the visual resources of the park by creating a more historically accurate landscape. Further, because this area has already been farmed and therefore, disturbed, the Preferred Alternative will not alter an undisturbed, natural setting.

Other viewsheds will be altered by the reintroduction of agriculture into the park, which will result in moderate beneficial impacts to the visual resources of this area. The cultivated and grazed fields will be visible from the State Highway 264 and park entrance road. Grazing livestock might be one of the first sights that visitors see when arriving at the park. The revitalization of agriculture in the Ganado community due to the Ganado Irrigation Project should result in the reintroduction of agriculture in other fields in the community. These revitalized visual resources will enhance the visual appeal of this rural valley and will most likely be welcomed by the community as a whole.

Cumulative Effects - The reintroduction of historic agriculture in a sustainable production mix will have a moderate beneficial impact on visual resources by creating a cultivated and grazed landscape in what is currently disturbed scrublands. Development along State Highway 264 and on the Navajo Nation has resulted in the construction of buildings and structures that are visible from HUTR. The reintroduction of agriculture will have moderate beneficial effect on the viewshed from/to the historic district. The introduction of new buildings into the broader historic landscape of the park and its surroundings has had a minor to moderate, adverse, effect to the park's historic setting and natural night sky. Other projects including renovations of historic buildings within the park (barn stabilization and parapet repair to the visitor center) will enhance the visual setting of the historic district to a minor degree. The construction of a museum storage facility will have a negligible effect on visual resources, as it will occur in the developed area beyond the viewshed from the historic district. Cumulatively, the moderate, beneficial effects of the Preferred Alternative, in addition to the minor beneficial effects of building renovation within the park and the minor adverse effects of development on the Navajo Nation outside the park, will result in a combined moderate, beneficial effect on the visual resources and historic setting at HUTR.

Conclusion - The Preferred Alternative will have moderate, beneficial effects on the viewshed from/to the historic district of the park due to the aesthetic nature of cultivated fields. Sustainable production for the reintroduction of agriculture will also have moderate, beneficial effects on the visual resources associated with the entrance road to the park, State Highway 264, and the adjacent portions of the Navajo Nation. There would be no impairment of the park's resources or values.

TOPOGRAPHY AND SOILS

Intensity Level Definitions

Analyses of the potential intensity of impacts to soils were derived from the available information regarding natural systems and soils of HUTR. The thresholds of change for the intensity of impacts to soils are defined as follows:

- Negligible:** The impact is at the lowest levels of detection - barely measurable with no perceptible effects on soils.
- Minor:** The impact is slight but detectable, with few perceptible effects on soils, and localized in area.
- Moderate:** The impact on soils is readily apparent and measurable.
- Major:** The impact on soils is severely adverse or exceptionally beneficial.
- Impairment:** A major, adverse impact to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of HUTR; (2) key to the natural or cultural integrity of the site; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents.

Effects of Alternative A (No-Action)

There would be no direct impacts to soils or topography with the No Action Alternative. Minor to moderate adverse indirect effects would continue due to erosion in the historically farmed fields. The abandoned fields will not achieve the plant community organization present before cultivation. The lack of native vegetation structure or cultivated plants leaves much of the soil unbound and susceptible to erosion.

Cumulative Effects - The abandonment of the fields in the late 1950's has contributed to soil erosion in the fields. The No Action Alternative would continue to contribute a minor to moderate adverse effect on the soils. The restoration of the Wash should contribute a minor beneficial effect on soil erosion in those areas. Cumulatively, the minor to moderate adverse effect in addition to minor beneficial effects of restoration measures would result in a minor adverse effect under the No Action alternative.

Conclusion - There would continue to be an indirect minor to moderate effect upon soils under the No-Action alternative. Cumulatively, adverse impacts to soils resulting from field erosion in addition to moderate beneficial impacts from wash restoration would result in a minor adverse effect to soils. There would be no impairment of the park's resources or values.

Effects of Alternative B (Preferred Alternative)

The Preferred Alternative will alter the soil conditions at the project site. Soil erosion, soil composition and soil chemistry will all be affected. The tillage of soils can have negative impacts on erosion due to the loosening of soil particles. Nevertheless, the current scrubland vegetation composition provides minimal soil binding effects, contributing to considerable wind erosion within the fields. Proper agricultural soil management techniques, such as the use of cover crops to bind soils and erosion mitigating tillage techniques can mitigate these negative effects. Under proper management the beneficial effects of erosion control techniques can decrease wind erosion in the fields resulting from the lack of soil binding vegetation. Soil properties such as chemistry and composition will be improved under this alternative. The amending of soils through nutrient enhancement and aeration will improve the soil structure and biotic component of the soils. Agricultural activities will improve mycorrhizal and beneficial microbial content creating soil conditions that are more biologically active and ecologically resilient. There would be minor beneficial effects to soil conditions under the Preferred Alternative.

Cumulative Effects - The abandonment of the fields in the late 1950's has contributed to soil erosion in the fields. The Preferred Alternative would contribute a minor beneficial effect on the soils. The restoration of the wash should contribute a minor beneficial effect on soil erosion in those areas. Cumulatively, the minor beneficial effect on soils of the Preferred Alternative in addition to the minor beneficial effects of restoration measures would result in a minor to moderate beneficial effect.

Conclusion - There would be a minor beneficial effect upon soils under the Preferred Alternative. Cumulatively, this in conjunction with the minor beneficial impacts from wash restoration would result in a minor to moderate beneficial effect. There would be no impairment of the park's resources or values.

WILDLIFE

Intensity Level Definitions

Analyses of the potential intensity of impacts to wildlife were derived from the available information regarding natural systems and species lists of HUTR. The thresholds of change for the intensity of impacts to wildlife are defined as follows:

- Negligible:** The impact is at the lowest levels of detection - barely measurable with no perceptible effects on wildlife.
- Minor:** The impact is slight but detectable, with few perceptible effects on wildlife, and localized in area.
- Moderate:** The impact on wildlife is readily apparent and measurable.
- Major:** The impact on wildlife is severely adverse or exceptionally beneficial.
- Impairment:** a major, adverse impact to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of HUTR; (2) key to the natural or cultural integrity of the site; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents.

Impacts of Alternative A (No Action Alternative)

As the reintroduction of agriculture will not occur under the No-Action alternative, conditions for wildlife will be maintained at present levels. Therefore, impacts are expected to be negligible.

Cumulative Effects - Past development has occurred mostly within the developed region of the park preventing wildlife disruption elsewhere in the park. Most of the species within the park prefer the riparian areas surrounding the wash. The wash restoration project has provided a minor beneficial effect to wildlife which will likely increase with time. None of the reasonably foreseeable projects are anticipated to have any discernable effects on wildlife within the site. A recent plague has decimated Gunnison prairie dog populations, which had previously thrived in the abandoned fields. Nevertheless, this plague is not related to any past or present park actions.

Conclusion - There would be a negligible effect on wildlife under the No-Action alternative. Cumulatively, there would be minor, beneficial effects to wildlife due to wash restoration measures. There would be no impairment of the park's resources or values.

Impacts of Alternative B (Preferred Alternative)

The proposed project may have a minor to moderate adverse effect on local (within the fields) wildlife populations with a negligible effect on wildlife species within the watershed. There might be a negligible to minor beneficial effect on bird species with the reintroduction of fruit trees. Most of the bird species

now occur within the riparian areas surrounded by the wash and will not be affected. There are no threatened or endangered wildlife species on the site. The abandoned fields are a disturbed habitat that does not support the wildlife diversity found in more pristine habitats where native vegetation exists in natural distributions. Those species that do reside on the project site will have ample habitat in the surrounding scrublands in which to migrate. The minimizing of herbicide and other agrochemical use will assure that there are no toxic effects to wildlife. Also, the increased water content within the fields, coupled with increased edible biomass may increase wildlife activity within the fields periodically. There has been some concern about the Gunnison prairie dog populations that inhabit the abandoned fields. A recent plague has decimated these Gunnison prairie dog populations. Nevertheless, this plague is not related to any past or present park actions.

Cumulative Effects - Past development has occurred within the developed region of the park preventing wildlife disruption in the rest of the park. Most of the species within the park prefer the riparian areas surrounding the wash. The wash restoration project has provided a moderate beneficial effect to wildlife which will likely increase with time. None of the reasonably foreseeable projects are anticipated to have any discernable effects on wildlife within the site.

In light of this, there will be minor to moderate adverse effect on local wildlife populations with a negligible effect on wildlife species within the watershed. Effects will differ species by species and site by site. Nevertheless, the access to surrounding scrublands will accommodate species that do not prefer cultivated landscapes, while farming activities may attract those which prefer the increased water and biomass of cultivation. The cumulative effects of wash restoration will provide a moderate beneficial effect to wildlife.

Conclusion - The combined effects of the Preferred Alternative and other projects will result in a negligible effect to wildlife within the National Historic Site. There would be no impairment of the park's resources or values.

VEGETATION

Intensity Level Definitions

Analyses of the potential intensity of impacts to vegetation were derived from the available information regarding natural systems and species lists of HUTR. The thresholds of change for the intensity of impacts to vegetation are defined as follows:

- Negligible:** The impact on is at the lowest levels of detection - barely measurable with no perceptible effects on vegetation.
- Minor:** The impact is slight but detectable, with few perceptible effects on vegetation, and localized in area.
- Moderate:** The impact on vegetation is readily apparent and measurable.
- Major:** The impact on vegetation is severely adverse or exceptionally beneficial.
- Impairment:** A major, adverse impact to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of HUTR; (2) key to the natural or cultural integrity of the site; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents.

Effects of Alternative A (No-Action Alternative)

The vegetation succession in the fields following their abandonment has produced a scrubby irregular combination of native and exotic shrubs and grasses. The No-Action alternative will maintain this distribution in this successional stage indefinitely as the ground disturbance from decades of agriculture

will prevent it from reverting to natural distributions. There are no threatened or endangered plant species within the site. Therefore, the No-Action alternative will have negligible effects on the vegetation at HUTR.

Cumulative Effects - Construction of employee residences, maintenance buildings, and a new museum storage unit has resulted in the removal of the historic agricultural fields in the developed zone. This developed zone comprises an abandoned field that was a disturbed habitat before this action, thereby not impacting native communities. Restoration of the wash is on-going and will benefit native riparian species by eliminating exotic species and reducing competition for water. This will have a moderate beneficial effect on vegetation. In light of this, the negligible impacts to vegetation under the No-Action alternative compounded with the moderate beneficial effects due to the wash restoration will result in a moderate beneficial impact resulting from activities unrelated to this project.

Conclusion - Under the No-Action Alternative, a moderate beneficial effect to vegetation will occur due to the combined effects of wash restoration. There would be no impairment of the park's resources or values.

Effects of Alternative B (Preferred Alternative)

The vegetation succession in the fields following their abandonment has produced a scrubby irregular combination of native and exotic shrubs and grasses. The ground disturbance from decades of agriculture will prevent it from reverting to natural distributions. Therefore, the reintroduction of agriculture will allow for the productive use of land that has already been disturbed beyond its ability to achieve pre-agricultural vegetation conditions. There may be negligible to minor direct effects upon the immediate plant communities, which are already in a disturbed successional stage. There are no threatened or endangered plant species within the site. There are no unique habitats or endemic species within the site. The high diversity of cultivated species will increase soil microorganisms, nutrient cycling and biological interactions creating beneficial indirect effects. Therefore, the Preferred Alternative will have minor to moderate beneficial effects on the vegetation at HUTR.

Cumulative Effects - Construction of residences, maintenance buildings, and storage units over the years have resulted in the removal of the historic agricultural fields in the developed zone. This developed zone comprises abandoned fields that were a disturbed habitat before these actions, thereby not impacting native communities. Restoration of the wash has already begun and will benefit native riparian species by reducing competition for water with invasive species. This will have a moderate beneficial effect on vegetation.

In light of this, the minor to moderate beneficial impacts to vegetation under the Preferred Alternative from increasing plant diversity and providing indirect ecological services would be augmented because of the greater improvements to other portions of the park, namely the moderate beneficial impacts of native plants being restored along the wash. Therefore, the impacts of the Alternative B in addition to the impacts of other past, present, and reasonably foreseeable future actions would result in overall moderate beneficial effects to the National Historic Site.

Conclusion - The Preferred Alternative would result in moderate beneficial impacts to the vegetation because of increasing plant diversity and providing ecological benefits. Cumulatively, the Preferred Alternative in addition to the various planned preservation and restoration projects for the park's natural resources would result in moderate beneficial effects to the National Historic Site. There would be no impairment of the park's resources or values.

WATER RESOURCES

Intensity Level Definitions

Analyses of the potential intensity of impacts to water resources were derived from the available information regarding water quality and quantity at HUTR. The thresholds of change for the intensity of impacts to vegetation are defined as follows:

- Negligible:** The impact is at the lowest levels of detection - barely measurable with no perceptible effects on water resources.
- Minor:** The impact is slight but detectable, with few perceptible effects on water resources, and localized in area.
- Moderate:** The impact on water resources is readily apparent and measurable.
- Major:** The impact on water resources is severely adverse or exceptionally beneficial.
- Impairment:** A major, adverse impact to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of HUTR; (2) key to the natural or cultural integrity of the site; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents.

Effects of Alternative A (No Action Alternative)

Under the No Action Alternative there will be no changes to water quality or quantity. According to the 1997 Baseline Water Quality Data Inventory and Analysis there are no threats to water quality or quantity. Therefore, the No Action Alternative would have no effect on water resources at HUTR.

Cumulative Effects - Overall, the majority of past, present, and reasonably foreseeable future projects such as improvements to historic structures in the central historic district (parapet repair and HVAC to the visitor center, barn stabilization, and fire system replacement) and the construction of a museum storage facility will have negligible impacts on long-term water resource conditions at the site. Drinking water supplies for the park and the majority of the Navajo Nation are supplied by the Navajo Tribal Utility Authority (NTUA). The proposed projects will use water during construction. However, the amount of water needed to support these projects is minimal, and will have negligible effects on the drinking water supplies in the area.

Overall, the projects could result in a negligible degradation of local water resources, and such effects would be temporary, lasting only as long as construction. The site's "Level I" water quality status would not be affected by the proposal.

Conclusion - The current conditions at the site in addition to the cumulative effects of past, present and reasonable foreseeable future projects would result in negligible effects to water resources. There would be no impairment of the park's resources or values.

Effects of Alternative B (Preferred Alternative)

The Preferred Alternative would result in negligible to minor adverse impacts to water resources at HUTR. Water management and conservation methods outlined in this document and the resulting farm plan will result in a negligible to minor effect on water resources within the Site. The use of drip or sprinkler irrigation will not create the excessive runoff resulting from more wasteful irrigation practices such as flood irrigation. Therefore, these measures will ensure that only the water necessary for crop irrigation will be utilized. Although it is inevitable that some runoff will occur, this amount will be minimal and have a negligible impact on water quality and quantity within the Pueblo Colorado Wash.

The alteration of water quality by the use of agrochemicals and/or soil amendments is a factor to consider in the reintroduction of agriculture. The minimizing of chemical inputs in the Preferred Alternative will result in a negligible impact. The leaching of nitrogen into water supplies is a concern when using either synthetic or organic fertilizers. The use of more degradable organic fertilizers in the Preferred Alternative compounded with the negligible runoff resulting from water conservation methods will result in a negligible effect on water quality.

Cumulative Effects - Overall, the majority of past, present, and reasonably foreseeable future projects such as improvements to historic structures in the central historic district (parapet repair and HVAC to the visitor center, barn stabilization, and fire system replacement) and the construction of a museum storage facility will have negligible impacts on long-term water resource conditions at the site. Drinking water supplies for the park and the majority of the Navajo Nation are maintained by the Navajo Tribal Authority. The proposed projects will use water during construction. However, the amount of water needed to support these projects is minimal, and will have negligible effects on the drinking water supplies in the area.

In light of this, the negligible to minor impacts to the water quality from the reintroduction of strictly interpreted historic agriculture due to minimal runoff would have negligible further impacts from past, present and foreseeable future construction projects. Therefore, the impacts the Preferred Alternative in addition to the impacts of other past, present, and reasonably foreseeable future actions would result in an overall minor adverse effect to the water quality at HUTR.

Conclusion - The implementation of an irrigation system adhering to water conservation measures at the Site in addition to the cumulative effects of past, present and reasonable foreseeable future projects would result in minor adverse effects to water quality. There would be no impairment of the park's resources or values.

AIR QUALITY

Intensity Level Definitions

Analyses of the potential intensity of impacts to air quality were derived from the available information regarding the air quality status of HUTR. The thresholds of change for the intensity of impacts to air quality are defined as follows:

- Negligible:** The impact is at the lowest levels of detection - barely measurable with no perceptible effects on air quality.
- Minor:** The impact is slight but detectable, with few perceptible effects on air quality, and localized in area.
- Moderate:** The impact on air quality is readily apparent and measurable.
- Major:** The impact on air quality is severely adverse or exceptionally beneficial.
- Impairment:** A major, adverse impact to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of HUTR; (2) key to the natural or cultural integrity of the site; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents.

Effects of Alternative A (No Action Alternative)

HUTR currently has no threats to its air quality. Therefore, the No-Action alternative would have no effect on air quality at HUTR.

Cumulative Effects - Overall, the majority of past, present, and reasonably foreseeable future projects such as improvements to historic structures in the central historic district (parapet repair and HVAC to the visitor center, barn stabilization, and fire system replacement) and the construction of a museum storage facility will have negligible impacts on long-term air quality conditions at the site. Construction activities such as hauling material, operating equipment, and transportation could result in temporary increases of vehicle exhaust, emissions, and fugitive dust in the general project area. Any exhaust, emissions, and fugitive dust generated from construction activities related to these projects will be temporary and localized, and would likely dissipate rapidly because air stagnation at HUTR is rare. Overall, the projects could result in a negligible degradation of local air quality, and such effects would be temporary, lasting only as long as construction. The Class II air quality designation for HUTR would not be affected by the proposal.

Conclusion - The current conditions at the site in addition to the cumulative effects of past, present and reasonable foreseeable future projects would result in negligible adverse effects to air quality. There would be no impairment of the park's resources or values.

Effects of Alternative B (Preferred Alternative)

The Preferred Alternative would result in negligible to minor to moderate adverse impacts to HUTR depending upon choices made by the NPS farm plan and farmer. The use of draft animals instead of farm machinery would prevent the effects of polluting emissions. The use of petroleum powered farm machinery would create emissions, although this would occur in a localized area and only temporarily during certain phases of the farming cycle. Likewise, fugitive dust generated from plowing activities related to this project will be temporary and localized, occurring only during a small annual period of the farming cycle. The impacts would be slightly less with the utilization of animals instead of machinery. Dust would be generated as a result of removal of existing vegetation, however, this would be temporary in nature and could be minimized by watering of the site. Dust would likely dissipate rapidly because air stagnation at HUTR is rare.

Cumulative Effects - Overall, the majority of past, present, and reasonably foreseeable future projects such as improvements to historic structures in the central historic district (parapet repair and HVAC to the visitor center, barn stabilization, and fire system replacement) and the construction of a museum storage facility will have negligible impacts on long-term air quality conditions at the site. Construction activities such as hauling material, operating equipment, and transportation could result in temporary increases of vehicle exhaust, emissions, and fugitive dust in the general project area. Any exhaust, emissions, and fugitive dust generated from construction activities related to these projects will be temporary and localized, and would likely dissipate rapidly because air stagnation at HUTR is rare. Overall, the projects could result in a negligible degradation of local air quality, and such effects would be temporary, lasting only as long as construction. The Class II air quality designation for HUTR would not be affected by the proposal.

In light of this, the minor to moderate adverse impacts to the air quality from the reintroduction of agriculture in a sustainable production mix due to temporary fugitive dust from plowing and minor to moderate impacts in a highly mechanized context would have negligible further impacts from past, present and foreseeable future construction projects resulting in temporary, localized emissions and fugitive dust. Therefore, the impacts of the Preferred Alternative in addition to the impacts of other past, present, and reasonably foreseeable future actions would result in an overall minor to moderate adverse effect to the air quality at HUTR.

Conclusion - The Preferred Alternative would result in minor to moderate adverse impacts to the air quality as a result of fugitive dust and possible equipment emissions due to farming activities. Cumulatively, the Preferred Alternative in addition to the various planned construction projects would result in overall minor to moderate adverse effects to air quality at the National Historic Site. There would be no impairment of the park's resources or values.

SOCIOECONOMIC ENVIRONMENT

Intensity Level Definitions

Analyses of the potential intensity of impacts to the socioeconomic environment were derived from the available information regarding the community of Ganado in relation to HUTR. The thresholds of change for the intensity of impacts to the socioeconomic environment are defined as follows:

- Negligible:** The impact is at the lowest levels of detection - barely measurable with no perceptible effects.
- Minor:** The impact is slight but detectable, with few perceptible effects, and localized in area.
- Moderate:** The impact is readily apparent and measurable.
- Major:** The impact is severely adverse or exceptionally beneficial.
- Impairment:** A major, adverse impact to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of HUTR; (2) key to the natural or cultural integrity of the site; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents.

Effects of Alternative A (No Action Alternative)

Under the No-Action alternative, no changes to the socioeconomic environment at HUTR would occur. The proposed no-action would neither change local and regional land use nor appreciably impact local businesses or other agencies. The effects of local employment and tourist benefits to local businesses would not be affected.

Cumulative Effects - Overall, the majority of past, present, and reasonably foreseeable future projects such as historic structures in the central historic district (parapet repair and HVAC to the visitor center, barn stabilization, and fire system replacement) and the construction of a museum storage facility will have negligible impacts on long-term socioeconomic environment at the site. Implementation of these proposed actions could provide a negligible beneficial impact to the economies of nearby Ganado, Arizona, as well Apache County due to minimal increases in employment opportunities for the construction workforce and revenues for local businesses and governments generated from these additional construction activities and workers. Any increase in workforce and revenue, however, would be temporary and negligible, lasting only as long as construction. The Ganado Irrigation Water Conservation Project, involving the Bureau of Reclamation, the Navajo Nation Department of Water Resources and the Natural Resource Conservation Service consists of rehabilitating and improving the existing Ganado Irrigation System located within the Ganado Chapter of the Navajo Nation and will have larger impacts on the socioeconomic environment at the site. Moderate beneficial effects to the socioeconomic environment should accrue through the revitalization and improvements of agriculture in the region.

In light of this, the No-Action Alternative will contribute no measurable effect to the socioeconomic environment. Cumulatively, there will be a moderate beneficial effect due to revitalization of agriculture within the Ganado Valley due to the Ganado Irrigation and Water Conservation Project and the resulting economic potential.

Conclusion - The No-Action Alternative in addition to the cumulative effects of the Ganado Irrigation Project would result in moderate beneficial impacts to socioeconomic environment at the Site.

Effects of Alternative B (Preferred Alternative)

Under the Preferred Alternative B, there would be a minor beneficial effect to the socioeconomic environment at HUTR. The reintroduction of agriculture in a sustainable production mix would provide “niche” crops /products to a community farmer(s) for those crops/products that have a current market. The farmer may provide local employment for help on the farmlands. Also the farm operations may benefit the community indirectly by providing revenues that stay within the community. The revitalization of agriculture in the Ganado Valley is a goal of the Ganado Irrigation Water Conservation Project. By developing a demonstration farm, HUTR may serve as an example to community farmers of the feasibility of restoring agriculture as a means of community development. This trend has the potential to validate agriculture as a career option to young, potential farmers, therefore building the community socioeconomic base. The use of the park farmlands as research and demonstration fields, customized and feasible in this particular community and “testing grounds” for experimentation and education may serve the local community of current and future farmers.

Cumulative Effects - Overall, the majority of past, present, and reasonably foreseeable future projects such as historic structures in the central historic district (parapet repair and HVAC to the visitor center, barn stabilization, and fire system replacement) and the construction of a museum storage facility will have negligible impacts on long-term socioeconomic environment at the site. Implementation of these proposed actions could provide a negligible beneficial impact to the economies of nearby Ganado, Arizona, as well Apache County due to minimal increases in employment opportunities for the construction workforce and revenues for local businesses and governments generated from these additional construction activities and workers. Any increase in workforce and revenue, however, would be temporary and negligible, lasting only as long as construction. The Ganado Irrigation Water Conservation Project, involving the Bureau of Reclamation, the Navajo Nation Department of Water Resources and the Natural Resource Conservation Service consists of rehabilitating and improving the existing Ganado Irrigation System located within the Ganado Chapter of the Navajo Nation and will have larger impacts on the socioeconomic environment at the site. Minor beneficial effects to the socioeconomic environment through the revitalization and improvements of agriculture in the region will accrue.

In light of this, the minor beneficial impacts to the socioeconomic environment from the reintroduction of agriculture in a sustainable production mix due to increased farm revenue, employment and local economic development would have negligible further beneficial impacts from past, present and foreseeable future construction projects. Therefore, the impacts of the Preferred Alternative in addition to the impacts of other past, present, and reasonably foreseeable future actions would result in an overall minor beneficial effect to the socioeconomic environment at HUTR.

Conclusion - The effects of the Preferred Alternative at the site in addition to the cumulative effects of past, present and reasonable foreseeable future projects would result in moderate beneficial effects to the socioeconomic environment at HUTR.

CHAPTER 5 - CONSULTATION/COORDINATION

PUBLIC AND AGENCY SCOPING

Initial project scoping was conducted to inform various agencies and the public about the proposal to reintroduce agriculture at Hubbell Trading Post National Historic Site, and to elicit comments, issues, and concerns with regards to the project. The following actions were taken on the part of the National Park Service as part of the public scoping process for this Environmental Assessment/Assessment of Effect, as listed by date:

Section 106 Consultation/Tribal Consultation Letters, Date – A formal letter was submitted to the Navajo Nation Historic Preservation Department describing the project and initiating Section 106 consultation for historic properties (Appendix A). No response was received. To initiate Native American consultation, this same letter was also submitted to associated state and tribal entities, as listed below (Appendix B). No comments were received from any of these tribal entities.

Press Release for Scoping, September 25, 2002 – A press release describing the proposed action and the Environmental Assessment/Assessment of Effect was issued by means of direct mailing to the list of stakeholders and interested parties that the park maintains, in addition to posting the press release at the park's visitor center. With this press release, the public was given 30-days to comment on the project from September 25 – October 25, 2002. One comment of support for the project was received during this time.

Combined NEPA/Section 106 October 24, 2002 – A formal letter was submitted to the Navajo Nation Historic Preservation Department to inform them that the preparation of this Environmental Assessment/Assessment of Effect would also be used to comply with Section 106 of the National Historic Preservation Act, in the form of a combined document entitled an Environmental Assessment/Assessment of Effect (see Appendix A).

Press Release for Environmental Assessment/Assessment of Effect Public Review, date A press release was issued to inform the public of the availability of the Environmental Assessment/Assessment of Effect for public review and comment (Appendix A). The press release was issued by means of direct mailing to the list of stakeholders and interested parties including newspapers. In addition, the press release was posted at the park's visitor center, in Ganado, and on the park's website. The comment period for this review lasts 30-days. Comments received during this time will be analyzed, and a decision document for this project will be prepared.

INTERNAL SCOPING

Internal scoping for the development of alternatives for this project was conducted with a team comprised of National Park Service employees, Ganado Farm Board officers, agricultural agency representatives (Navajo Nation Department of Agriculture and Natural Resource Conservation Service), and other interested individuals. The team met October 9, 2002 to review project needs, to identify impact issues and to suggest solutions (alternatives) to achieve project goals. The results from this meeting provided much of the background information used in Chapters 1 and 2 of this Environmental Assessment/Assessment of Effect (NPS 2002).

LIST OF AGENCIES, TRIBES, AND INDIVIDUALS CONTACTED

The following list of persons, organizations, tribes, and agencies were contacted for information, assisted in identifying important issues, or were identified as stakeholders and notified of the proposed project to reintroduce agriculture at Hubbell Trading Post National Historic Site.

Navajo Nation Agencies

Navajo Nation Historic Preservation Department
Navajo Nation Department of Fish and Wildlife, Division of Natural Resources
Navajo Nation Department of Agriculture

Federal Agencies

Advisory Council on Historic Preservation
Natural Resources Conservation Service

State Agencies

Arizona Game and Fish Department

Affiliated Native Americans

Governor Regis Pecos, Cochiti Pueblo
President Roger Vicente, Jicarilla Apache Tribe
Governor Cyrus J. Chino, Pueblo of Acoma
Governor Lawrence Troncosa, Pueblo of San Felipe
Governor Perry Martinez, Pueblo of San Ildefonso
Governor Denny Gutierrez, Pueblo of Santa Clara
Governor William Torivio, Pueblo of Zia
Governor Ramon C. Garcia, Pueblo of Santo Domingo
Chairman Wayne Taylor, Hopi Tribe
Governor Harry Early, Pueblo of Laguna
Governor Alvino Lucero, Pueblo of Isleta
Governor Clarence Chile, Pueblo of Picuris
Governor Stewart Paisano, Pueblo of Sandia
Governor Nelson J. Cordova, Pueblo of Taos
Acting Chairman Vida Peabody, Southern Ute Indian Tribe
Governor Joe V. Cajero, Jemez Pueblo
President Kelsey Begaye, Navajo Nation
Governor David Perez, Pueblo of Nambe
Governor Jacob Viarrial, Pueblo of Pojoaque
Governor Bruce Sanchez, Pueblo of Santa Ana
Governor Charlie Dorame, Pueblo of Tesuque
Governor Malcolm Bowekaty, Pueblo of Zuni
Chairman Ernest House, Ute Mountain Tribe
Celestino Gachupin, Pueblo of Zia
Rick Quezada, Ysleta del Sur Pueblo
Leigh Kuwanwisiwma, Hopi Cultural Preservation Office
Victor Sarracino, Laguna Pueblo
Herman Agoyo, Pueblo of San Juan
Jenny Holmes, Pueblo of Sandia
Jicarilla Cultural Center, Jicarilla Apache Tribe
Governor Wilfred Garcia, Pueblo of San Juan
Tony Herrera, Cochiti Pueblo
Richard Mermejo, Pueblo of Picuris
Mark Mitchell, Pueblo of Tesuque
William Whatley, Jemez Pueblo
President Sara Miguez, Mescalero Apache Tribe
Petuuche Gilbert, Pueblo of Acoma
Ben Lucero, Pueblo of Isleta
Charlie Tapia, Pueblo of Pojoaque

Myron Gonzales, Pueblo of San Ildefonso
Alan Downer, Navajo Nation HPD
Dan Simplicio, Pueblo of Zuni
Howard Richards, Southern Ute Tribe
Reva Suazo, Pueblo of Taos

PUBLIC REVIEW OF ENVIRONMENTAL ASSESSMENT/ASSESSMENT OF EFFECT

The Environmental Assessment/Assessment of Effect will be released to the public July 14, 2003. To inform the public of the availability of the Environmental Assessment/Assessment of Effect, the National Park Service will publish and distribute a letter and/or press release to agencies, tribes, and members of the public on the park's mailing list. The Environmental Assessment/Assessment of Effect will be available for review at various repositories during the comment period including the park's visitor center, on-line at www.nps.gov/hutr, in addition to other repositories such as Ganado chapter house.

The Environmental Assessment/Assessment of Effect is subject to a 30-day public comment period from July 14 to August 15, 2003. During this time, the public is encouraged to submit their written comments to the National Park Service address provided at the beginning of this document. Following the close of the comment period, all public comments will be reviewed and analyzed, prior to the release of a decision document. The National Park Service will issue responses to substantive comments received during the public comment period, and will make appropriate changes to the Environmental Assessment/Assessment of Effect, as needed.

LIST OF PREPARERS

Consultants

Nancy Stone, Superintendent, National Park Service, Hubbell Trading Post National Historic Site, Ganado, Arizona

Cheryl Eckhardt, NEPA/106 Specialist, National Park Service, Intermountain Region Support Office, Denver, Colorado

EnviroSystems Management, Inc., Environmental Planning and Regulatory Compliance, Flagstaff, Arizona

Researcher

Jeremy McClain, Research Assistant, The Center for Sustainable Environments, Northern Arizona University, Flagstaff, Arizona

LIST OF RECIPIENTS

Notification of the availability of the Environmental Assessment/Assessment of Effect was given to the agencies and members of the public listed on the park's mailing list (including Navajo Nation agencies, BIA departments, and local organizations). Copies of the Environmental Assessment/Assessment of Effect were mailed to the Navajo Nation Historic Preservation Department, the Navajo Nation Department of Fish and Wildlife, Division of Natural Resources and the Navajo Nation Department of Agriculture. Copies of the Environmental Assessment/Assessment of Effect will be distributed to the Native American tribes and interested individuals, upon request. Copies are also being made available at local repositories as described in the *Public Review of Environmental Assessment/Assessment of Effect* section.

REFERENCES

- ESM 2002 *A Survey for the Federally Endangered Southwestern Willow Flycatcher (*Empidonax traillii extimus*), Hubbell Trading Post National Historic Site, Ganado, Arizona*, prepared for the National Park Service, prepared by EnviroSystems Management, Inc. (ESM), July 29, 2002.
- NPS 1983 *Soil Erosion Study, Hubbell Trading Post National Historic Site, Ganado, Arizona*, prepared by Earth Technology Corporation, 1983.
- NPS 1986 *Statement for Management, Hubbell Trading Post National Historic Site, Ganado, Arizona*, prepared by Hubbell Trading Post National Historic Site with assistance from the Southwest Regional Office, National Park Service, Sante Fe, New Mexico, January 1986.
- NPS 1989 National Register Bulletin: Guidelines for Evaluating and Documenting Rural Historic Landscapes, by Linda Flint McClelland, J. Timothy Keller, Genevieve P. Keller, and Robert Z. Melnick, National Park Service, Interagency Resources Division, 1989.
- NPS 1993 *Hubbell Trading Post National Historic Site, An Administrative History*, prepared by Albert and Ann Manchester, for the National Park Service, Division of History, Southwest Cultural Resources Center, Sante Fe, New Mexico, Professional Papers No. 46, 1993.
- NPS 1995 *Managing Culturally Significant Agricultural Landscapes in the National Park System*, prepared by Richard Westmacott for the National Park Service, Cultural Landscape Program and Park Historic Architecture Program, September 1995.
- NPS 1996a *Managing Culturally Significant Agricultural Landscapes in the National Park System, Volume Two: Managing Agriculture in the National Park System*, prepared by Richard Westmacott for the National Park Service, Cultural Landscape Program and Park Historic Architecture Program, October, 1996.
- NPS 1996b *Resources Management Plan: Hubbell Trading Post National Historic Site*, prepared by NPS, February 1996.
- NPS 1997 *Baseline Water Quality Data Inventory and Analysis: Hubbell Trading Post National Historic Site*, National Park Service Water Resources Division, December, 1997.
- NPS 1998 *Cultural Landscape Report: Hubbell Trading Post National Historic Site, Ganado, Arizona*, prepared by Peggy Froeschauer-Nelson, National Park Service, Intermountain Support Office, Cultural and National Register Programs, Sante Fe, New Mexico, 1998.
- NPS 1999a *Hubbell Trading Post Official Map and Guide*, brochure produced by the National Park Service, US Department of the Interior, printed in 1990 by the Government Printing Office.
- NPS 1999b *Animal Management Plan, Environmental Assessment, Hubbell Trading Post National Historic Site, Arizona*, prepared by Nancy Stone, National Park Service, U.S. Department of the Interior, Hubbell Trading Post National Historic Site, printed in November, 1999.
- NPS 2000a *2001-2005 Strategic Plan, Hubbell Trading Post National Historic Site*, prepared by HUTR GPRA Task Force, National Park Service, 2000.

- NPS 2000b *Management Policies*, National Park Service, U.S. Department of the Interior, December 2000.
- NPS 2002a Various species reports from the Inventory and Monitoring Program, including plants, mammals, birds, and reptiles/amphibians. These lists indicate that many of these lists were developed or updated based on species recorded during 2002 surveys.
- NPS 2002b *Evaluation of Previously Recorded Archaeological Sites and Geomorphology at the Hubbell Trading Post National Historic Site, Ganado, Arizona*, prepared by Shirley Powell, Bruce G. Phillips, and Paige Barlow, National Park Service, Hubbell Trading Post National Historic Site, printed in 2002 by the Archeological Consulting Services, Ltd.
- NPS 2002c *Vertebrate Inventory and Monitoring for Pueblo Colorado Wash, Hubbell Trading Post National Historic Site*, prepared by Harley Shaw and Patricia Woodroof of the Juniper Institute, October, 2002.
- NRCS 2002 Telephone conversation on November 15, 2002 between Dan Bloedel, District Conservationist for The United States Department of Agriculture / National Resources Conservation Service and Jeremy McClain, EA prepare regarding impacts of soil resources resulting from the reintroduction of agriculture at HUTR.
- Peterson 1986 *Homestead And Farm: A History Of Farming At The Hubbell Trading Post National Historic Site*, by Charles S. Peterson, Utah State University, prepared for Southwest Parks and Monuments Association, March 1, 1986.
- Zimmerman 2002 *A Cultural Resources Inventory for a Reforestation Project and Storage Building Construction at Hubbell Trading Post National Historic Site, Apache County, Arizona*, prepared by David Zimmerman, Archaeologist, prepared for Hubbell Trading Post National Historic Site, May 2002.

APPENDIX A: SECTION 106 CONSULTATION LETTERS



United States Department of the Interior
NATIONAL PARK SERVICE
INTERMOUNTAIN FIELD AREA
Hubbell Trading Post National Historic Site
P.O. Box 150
Ganado, Arizona 86505-0150

October 24, 2002

Alan Downer, Director
Navajo Nation Historic Preservation Department
P.O. Box 4950
Window Rock, AZ 86505

Dear Mr. Downer:

The National Park Service proposes to reintroduce agriculture at Hubbell Trading Post National Historic Site to restore and enhance the cultural landscape of the historic homestead. The reintroduction is planned to occur within approximately 90 acres of the previously farmed 110-acre fields. The process will be phased to accommodate the renewal of the farmfields, the need for operating funds and the required preparation by the park to undertake this new activity. A more specific farm plan will be developed after a preferred alternative is selected during the environmental assessment process.

Accordingly an environmental assessment (EA) for the proposed project is being prepared. Preparation of an EA is necessary to meet the requirements of the National Environmental Policy Act. In addition, the process and documentation required for preparation of the EA will be used to comply with §106 of the National Historic Preservation Act. In accordance with section 800.8(c) of the Advisory Council on Historic Preservation's regulations (36 CFR Part 800), I am notifying your office in advance of the park's intention to use the EA to meet its obligations under §106.

If you should have any questions, please contact me at (928) 755-3475.

Sincerely,

Nancy Stone
Superintendent

cc:
Jane Crisler, Advisory Council on Historic Preservation



United States Department of the Interior
NATIONAL PARK SERVICE
INTERMOUNTAIN FIELD AREA
Hubbell Trading Post National Historic Site
P.O. Box 150
Ganado, Arizona 86505-0150

October 24, 2002

Sabra S. Schwartz
State of Arizona
Game and Fish Department
Habitat Branch – HDMS Program
2221 West Greenway Road
Phoenix, AZ 85023-4399

Dear Ms. Schwartz:

The National Park Service proposes to reintroduce agriculture at Hubbell Trading Post National Historic Site to restore and enhance the cultural landscape of this historic homestead. The reintroduction is planned to occur within approximately 90 acres of the previously farmed 110-acre fields. A map of the proposed location for the agricultural operations is enclosed for your reference. The process will be phased to accommodate the renewal of the farmfields, the need for operating funds and the required preparation by the park to undertake this new activity. A more specific farm plan will be developed after a preferred alternative is selected during the environmental assessment process.

Accordingly, an Environmental Assessment (EA) for the proposed project, which is necessary to meet the requirements of the National Environmental Policy Act is being prepared. As part of that preparation, I am requesting a list of special status species for the project area.

I thank you in advance for sharing your expertise in this matter. If you should have any questions at this point in time, please feel free to contact me at (928) 755-3475.

Sincerely,

Nancy Stone
Superintendent



United States Department of the Interior
NATIONAL PARK SERVICE
INTERMOUNTAIN FIELD AREA
Hubbell Trading Post National Historic Site
P.O. Box 150
Ganado, Arizona 86505-0150

October 24, 2002

Gloria M. Tom, Director
Navajo Natural Heritage Program
Department of Fish and Wildlife
P.O. Box 1480
Window Rock, Arizona 86515

Dear Ms. Tom:

The National Park Service proposes to reintroduce agriculture at Hubbell Trading Post National Historic Site to restore and enhance the cultural landscape of this historic homestead. The reintroduction is planned to occur within approximately 90 acres of the previously farmed 110-acre fields. A map of the proposed location for the agricultural operations is enclosed for your reference. The process will be phased to accommodate the renewal of the farmfields, the need for operating funds and the required preparation by the park to undertake this new activity. A more specific farm plan will be developed after a preferred alternative is selected during the environmental assessment process.

Accordingly, an Environmental Assessment (EA) for the proposed project, which is necessary to meet the requirements of the National Environmental Policy Act is being prepared. As part of that preparation, I am requesting a list of species of concern for the project area.

I thank you in advance for sharing your expertise in this matter. If you should have any questions at this point in time, please feel free to contact me at (928) 755-3475.

Sincerely,

Nancy Stone
Superintendent

APPENDIX B: TRIBAL CONSULTATION LETTERS
IDENTICAL LETTER SENT TO THE FOLLOWING RECIPIENTS:

Governor Regis Pecos, Cochiti Pueblo
President Roger Vicente, Jicarilla Apache Tribe
Governor Cyrus J. Chino, Pueblo of Acoma
Governor Lawrence Troncosa, Pueblo of San Felipe
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Alan Downer, Navajo Nation HPD
Dan Simplicio, Pueblo of Zuni
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Reva Suazo, Pueblo of Taos



Press Release

Subject: Public Scoping for the Reintroduction of Agriculture at
Hubbell Trading Post National Historic Site
Contact: Nancy Stone, Superintendent
Phone: (928) 755-3475
Date: October 24, 2002

The National Park Service is planning to reintroduce agriculture at Hubbell Trading Post National Historic Site. The reintroduction is planned to occur within approximately 90 acres of the previously farmed 110-acre fields as a result of bringing irrigation back to the Ganado valley. The community-wide Ganado Irrigation and Water Conservation project is a cooperative effort involving the Bureau of Reclamation (BOR), Natural Resource Conservation Service (NRCS), Navajo Nation Department of Water Resources, Bureau of Indian Affairs, National Park Service, Ganado Water Users Association, Ganado Farm Board, and Ganado Unified School District. Northern Arizona University's Center for Sustainable Environments will join this cooperative effort by assisting Hubbell Trading Post National Historic Site in preparing the Environmental Assessment (EA) for the portion of the project which restores agriculture to the Historic Site.

The community irrigation project modernizes the main canal of the historic irrigation system originally designed by John Lorenzo Hubbell to bring water from Ganado Lake to the fields of his homestead. When water is available, the National Park Service intends to gradually reintroduce farming to its now dormant fields and to interpret the historic and cultural elements of this traditional activity. Restoration of agricultural fields, and thus the cultural landscape of the Historic Site has been a long-standing management goal of the park.

Accordingly, an Environmental Assessment for reintroducing agriculture will be prepared in compliance with the National Environmental Policy Act (NEPA) to provide the decision-making framework that 1) analyzes a reasonable range of alternatives to meet project objectives, 2) evaluates potential issues and impacts to park resources and values, and 3) identifies mitigation measures to lessen the degree or extent of these impacts.

The National Park Service encourages public participation throughout the Environmental Assessment process. During this process, the public has two opportunities to formally comment on the project; during initial project scoping and following release of the Environmental Assessment. The National Park Service is currently in the scoping phase of this project, and invites you to submit your written comments to the address below. Following receipt of these comments, an Environmental Assessment will be prepared, at which time the public will be provided another opportunity to comment on the project. Please provide all comments by November 27, 2002 to:

Nancy Stone, Superintendent
Hubbell Trading Post National Historic Site
P.O. Box 150
Ganado, AZ 86505-0150