

ENVIRONMENTAL ASSESSMENT FOR
WUPATKI NATIONAL MONUMENT
WASTEWATER SYSTEM PROJECT

July 2010



Prepared for:
National Park Service
U.S. Department of Interior
Flagstaff Area National Monuments
Flagstaff, Arizona

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Wupatki National Monument Wastewater System Environmental Assessment

Summary

Wupatki National Monument (WUPA) is proposing to replace the treatment and disposal method for the existing administrative area wastewater system, which consists of three evaporative lagoons. The three evaporative lagoons provide constant compliance and operational concerns due to the undersized leveling system between the lagoons. In addition, a variety of problems with piping and poor design have resulted in violations of Arizona Department of Environmental Quality (ADEQ) and United States Public and Health Safety regulations over the years. The lagoons are also located in the viewshed of the monument and the primary view from the visitor center. WUPA proposes to rehabilitate the existing wastewater system by replacing the treatment and disposal method to meet the ADEQ and U.S. Health Public Service standards. The rehabilitation of the existing wastewater system will accommodate the current and future wastewater use for the current annual visitation numbers and residential and employee housing plus the projected annual visitation numbers. The proposed improvements would also enhance employee health and safety by eliminating handling of raw sewage, eight confined spaces (manholes), and improve visitor experience by restoring the landscape and viewshed to natural conditions.

This Environmental Assessment (EA) evaluates 2 alternatives; a No Action Alternative (I), and the Preferred Alternative (II). The No Action alternative would maintain the current sewage conditions. Actions under the Preferred Alternative include replacing the treatment and disposal method (i.e., evaporative sewer lagoons) for the wastewater system with a septic tank, a recirculation tank, a fabric filtration system, and new drainfield chambers.

This Environmental Assessment has been prepared in compliance with the National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) to provide the decision-making framework that:

- 1) analyzes a reasonable range of alternatives to meet objectives of the proposed plan;
- 2) evaluates potential issues and impacts to the natural and cultural resources of Wupatki National Monument; and
- 3) identifies specific and required mitigation measures that are designed to lessen the degree or extent of these impacts.

Resource topics determined to potentially be affected by the alternatives include: Geologic and Soil Resources, Vegetation Resources, Wildlife, Special Status Species, Water Resources, Cultural Resources, Visitor Use Experience, Visual Resources, and Public Health. Other resource topics were examined and dismissed because it was determined that this plan would result in only negligible or minor effects to those resources. No major effects are anticipated as a result of this program. Public scoping will be conducted to assist with the development of this document and comments will be received.

Public Comment

The Wupatki EA will be available via the internet at <http://parkplanning.nps.gov/Plans.cfm>. If you wish to make a comment on this EA, please submit written suggestions, comments, and concerns regarding the proposed project online at the NPS Planning, Environment, and Public Comment (PEPC) website at: <http://parkplanning.nps.gov/>. Click on Flagstaff Areas in the “Choose a Park” pulldown menu then click on the “WUPA Construct Leachfield and Remove Old Sewer Lagoons,” then click on “Open for Public Comment” on the left sidebar, then click on the document and finally click on “Comment on Document”.

If you are not able to submit comments electronically and wish to comment on this EA, please mail your comments to the name and address listed below. The EA will be available for public comments for 30 days; the comments are due by September 9, 2010. Please note the names and addresses of comments received become public record. If you wish your name and/or address to not be used, then you must state this at the beginning of your comments. All submissions made by organizations, businesses, and individuals identifying themselves as representatives or officials of organizations or businesses will be available for public review in their entirety.

Please address comments to:

Superintendent; Attn: Flagstaff Area National Monuments; 6400 N. Highway 89, Flagstaff, Arizona 86004.

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1.0 PURPOSE AND NEED

1.1 Introduction

Wupatki National Monument (WUPA) is located in northern Arizona approximately 35 miles northeast from Flagstaff (Figure 1). WUPA is 35,422 acres surrounded by Coconino National Forest, Navajo Nation, and private lands. It was established on December 9, 1924 by President Proclamation No. 1721 to preserve the Citadel and Wupatki prehistoric pueblos. The monument boundaries have changed several times since its establishment and now include additional archeological resources. The primary purpose of WUPA is to preserve, protect, care for, and manage the cultural and natural resources of prehistoric, historic, ethnographic, and scientific interest located within the monument.

WUPA's significance is explained relative to the nation's natural and cultural heritage as the following:

- WUPA is the only known southwest location where physical evidence for three separate Ancestral Puebloan cultures is found together at numerous archeological sites.
- WUPA has natural and cultural significance to current Native American tribes.
- WUPA includes well preserved prehistoric and historic sites, and has a high degree of cultural resource integrity.
- Includes one of the few ungrazed, native grasslands habitat in the Southwest that is essential to perpetuating native species and natural ecosystem processes.
- The unique undeveloped and unpopulated WUPA setting provides an opportunity to experience the land as prehistoric peoples did. These qualities also provide a baseline, which change can be monitored, managed, and mitigated.

WUPA has a semi-arid climate that includes moderately hot, moist summers and cool, dry winters. The mean annual temperature in WUPA is 57.9 F° with a mean summer temperature of 78 F° and a mean winter temperature of 37.9 F° (Western Regional Climate Center 2010). The mean annual precipitation is 8.05 inches with the majority of precipitation occurring between July to September (Western Regional Climate Center 2010).

The proposed project would include replacing the treatment and disposal method for the existing wastewater system for the park Visitor Center and administrative site. The proposed new treatment and disposal system includes one 12,000 gallon septic tank, one 3,000 gallon recirculation tank, one 1,000 gallon discharge septic tank, a fabric filtration system, approximately 230 linear feet of 2-1/2" Polyvinyl Chloride (PVC) sewer pipes, 25 linear feet of 6" PVC and 34 linear feet of 4" PVC gravity sewer pipe, 608 feet of drainfield chambers with 1-1/4" PVC laterals, and an electrical control station with electrical conduit and cables. The existing evaporative lagoons would be filled and the evaporative sewer structures (i.e., manholes, septic tanks, pits, distribution box) would be disconnected, pumped, and abandoned following the U.S. Public Health Services and Arizona Department of Environmental Quality standards. These improvements would be within the administrative zone as identified within the WUPA General Management Plan/Final Environmental Impact Statement (National Park Service (NPS) 2002). Approximately 0.49 acres within the proposed project area would be impacted.

1.2 Purpose of the Environmental Assessment

This Environmental Assessment (EA) has been prepared in compliance with the National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), and the National Park Service (NPS) Director's Order (DO) -12 to provide the decision-making framework that:

- 1) analyzes a reasonable range of alternatives to meet objectives of the proposed plan;
- 2) evaluates potential issues and impacts to the natural and cultural resources of Wupatki National Monument; and
- 3) identifies specific and required mitigation measures that are designed to lessen the degree or extent of these impacts.

1.3 Purpose and Need

Wupatki National Monument (WUPA) is proposing to replace the treatment and disposal method for the existing wastewater system, which consists of three evaporative lagoons. The current evaporative lagoons were built around 1978 to serve the visitor center, maintenance facility, and residential housing. The existing treatment and disposal system consists of three evaporative lagoons and approximately 770 feet of gravity sewer lines.

The three evaporative lagoons provide constant compliance and operational problems due to the undersized leveling system between the lagoons. The leveling system between the three lagoons requires intensive manipulation to achieve effluent leveling to maximize evaporation. The wastewater system was originally designed for fewer users and the limited available space led designers to use eight foot deep cells, which is ineffective evaporation due to the limited surface area. Efforts to level the cells and maximize evaporation require manual pumping, exposing employees to raw sewage and the accompanying health and safety issues. In addition to the safety issues, the lagoons are located in the viewshed of the monument and within site of the visitor center.

A variety of problems with piping and poor design have resulted in violations to the Arizona Department of Environmental Quality (ADEQ) and U.S. Public Health Service regulations over the years. Currently, the wastewater system serves the visitor center, maintenance facility, and residential housing. Annual visitation in 2008 to WUPA was approximately 245,700, using 869,400 gallons of water. The increased annual visitation to the visitor's center combined with the residential and employee use far exceeds the design capacity of the evaporative sewer lagoons. Failure to replace the current treatment and disposal methods for the wastewater system could result in a facility closure due to potential damage to the system and seepage of wastewater posing health risks to visitors and residents.

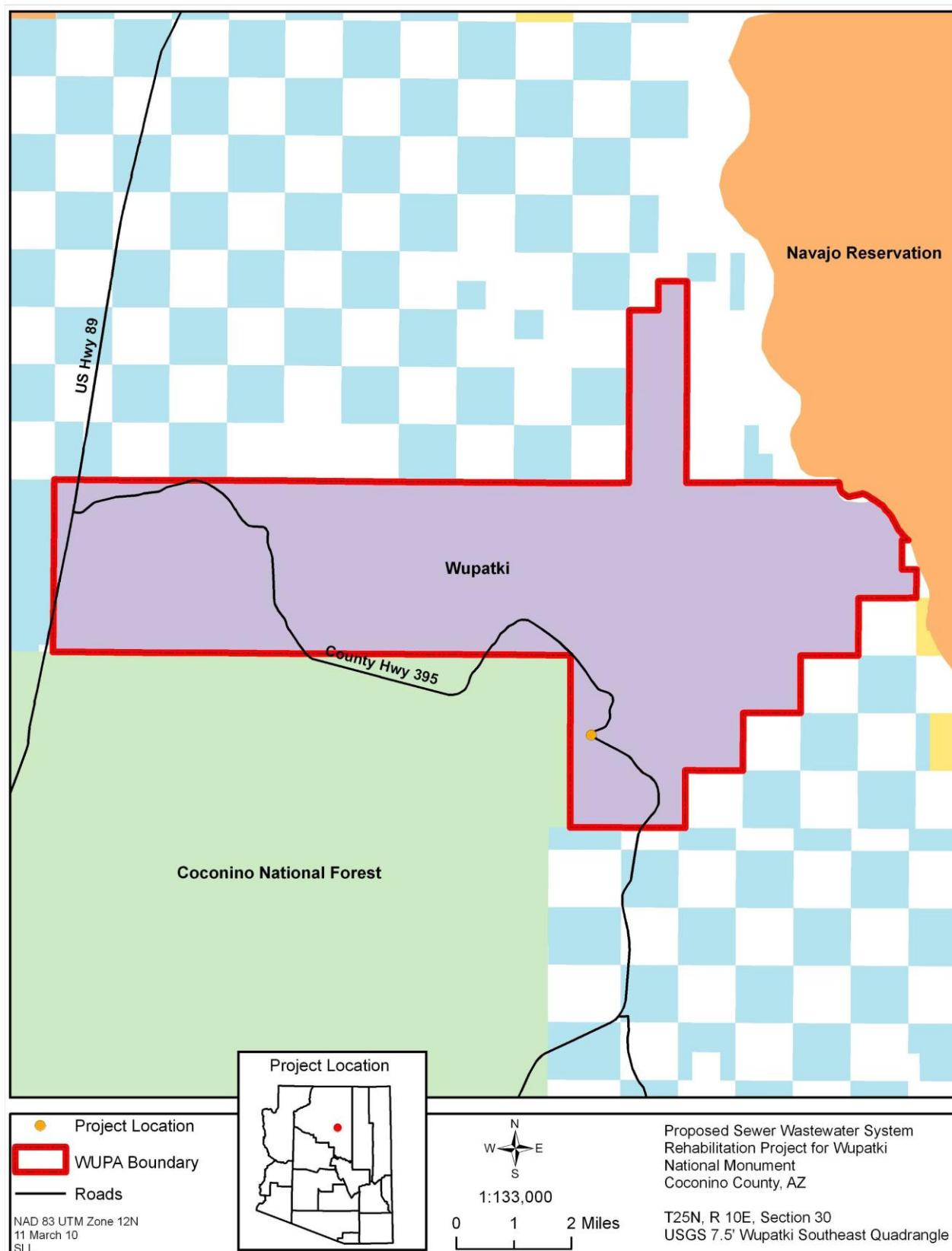


Figure 1. Location of Project in relation to WUPA Monument in northern Arizona.

In summary, the following objectives would be met with this project:

- Replace inadequate treatment and disposal method for current wastewater system
- Make changes to the wastewater system to meet the ADEQ and U.S. Public Health Service standards
- Improve employee health and safety by eliminating handling of raw sewage and eight confined spaces
- Increase the wastewater system operating capacity to accommodate current and future wastewater use
- Remove evaporative lagoons to enhance the visitor experience by restoring the landscape and viewshed to natural conditions

1.4 Scope of Plan

The scope of this EA is to develop a document identifying potential issues and impacts to the natural and cultural resources of WUPA through implementation of the proposed actions. This EA considers impacts within WUPA and adjacent lands that could reasonably be impacted by the proposed wastewater system construction; however, only activities occurring within the boundaries of WUPA are addressed in the scope of this document.

1.5 Relationship to Other Plans and Policies

The proposed action is consistent with the WUPA General Management Plan (GMP) /Final Environmental Impact Statement (NPS 2002) and the Flagstaff Area National Monuments Strategic Plan. The GMP analyzed operational efficiency, which is the ability to adequately protect and preserve vital park resources and provide for a pleasurable visitor experience. Utilities (i.e., sewer) that are used to facilitate operations of the park are included under this section. According to the FLAG Monuments Statements of Desired Optimum Conditions and Seven Year Project Plan (FLAG Monuments Strategic Plan) (NPS 2009), the desired optimum conditions for buildings and utilities are to assure operational functionality and visitor and employee safety. Preventative maintenance programs are established, timely, and support rehabilitation projects, such as the proposed wastewater system replacement. The rehabilitation of the existing wastewater system will accommodate the current and future wastewater use for the current annual visitation numbers and residential and employee housing plus the projected annual visitation numbers.

1.6 Public Scoping

Scoping is a process to identify the natural resources that may be impacted by the proposed project. Scoping assists project managers in identifying alternatives for achieving the proposed action, while minimizing the potential impacts. The National Park Service (NPS) conducted both internal scoping with the appropriate WUPA personnel, and external scoping with the general public and interested/affected groups and agencies.

Internal scoping was conducted by an interdisciplinary team of professionals from WUPA. The interdisciplinary team discussed the purpose and need for the project, identified potential

alternatives to address these needs, determined potential environmental impacts, discussed past, present, and foreseeable projects that may have cumulative effects, and potential mitigation measures.

External scoping was conducted by distributing a scoping letter to inform the public of the proposed treatment and disposal method replacement for the wastewater system at WUPA and to solicit feedback on the EA. The scoping letter dated [REDACTED], 2010 was mailed to 92 addressees, including adjacent land owners, various federal and state agencies, affiliated Native American tribes, and local agencies. The announcement was also published on the NPS Planning Environment and Public Comment (PEPC) website (<http://parkplanning.nps.gov>).

1.7 Impact topics Retained for Further Analysis

Impact topics for this project have been identified on the basis of federal laws, regulations, and orders, including the NPS 2006 Management Policies and NPS knowledge of resources at WUPA. Impact topics that are carried forward for further analysis in this Environmental Assessment are those where the proposed action may have a measurable effect. There were nine impact topics retained for further analysis. The rationale for retaining each of these topics is listed below with a description of the existing setting or baseline conditions within the project area. Some impact topics were dismissed from further consideration when there would be no effects or they were estimated to be negligible. The following impact topics were retained for further analysis:

Natural Resources

- 1) Geologic and Soil Resources
- 2) Vegetation
- 3) Wildlife
- 4) Special Status Species
- 5) Water Resources

Cultural Resources

- 6) Archeological

Social Issues

- 7) Visitor Use Experience
- 8) Visual Resources
- 9) Public Health and Safety

Natural Resources

1) Geologic and Soil Resources

The 2006 NPS Management Policies for the National Park Service (NPS) states the NPS will preserve and protect geologic features and processes from disturbances. These policies also state NPS will aim to understand and preserve the soil resources and to prevent unnatural erosion, removal, or contamination of them. The proposed treatment and disposal method replacement would require excavating and backfilling for utility trenches and septic tanks and topsoil removal for site clearing, which has potential to have a measurable impact on the soil resources; therefore impacts to this topic will be analyzed further.

2) Vegetation

The 2006 NPS Management Policies states the NPS will preserve and maintain all plants native to the naturally evolving park unit ecosystems by preserving and restoring the abundances, diversity, dynamics, habitats, distributions, and natural processes of native plants. The proposed treatment and disposal method replacement would require removing an area of native vegetation for the utility trenches, septic tanks, and new sewer lines; thus the topic of vegetation was retained for further analysis.

3) Wildlife

The 2006 NPS Management Policies states the NPS will preserve and maintain animals native to the naturally evolving park unit ecosystems by preserving and restoring the abundances, diversity, dynamics, habitats, distributions, and natural processes of native animals. There are approximately 230 vertebrate species recorded for WUPA. The proposed treatment and disposal method replacement would require disturbing an area of wildlife habitat for the installation of utility trenches, septic tanks, and new sewer lines; thus the topic of wildlife was retained for further analysis.

4) Special Status Species

The Endangered Species Act of 1973 requires an environmental assessment for projects on federally-managed lands to determine potential effects to all federally-listed endangered, threatened, and candidate species. Section 7 of the Endangered Species Act requires all federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of federally listed species or designated critical habitats. In addition, the 2006 NPS Management Policies and Director's Order 77 *Natural Resources Management Guidelines* require the NPS to examine the impacts on federal candidate species, as well as state-listed endangered, threatened, candidate, rare, declining, and sensitive species. The proposed treatment and disposal method replacement would potentially disturb an area of habitat for the Wupatki pocket mouse, and four bat species listed as "species of concern" for Coconino County, Arizona. Therefore the topic of special status species was retained for further analysis.

5) Water Resources

NPS policies require protection of water quality consistent with the Clean Water Act. The purpose of the Clean Water Act is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." To enact this goal, the U.S. Army Corps of Engineers has been charged with evaluating federal actions that result in potential degradation of waters of the United States and issuing permits for actions consistent with the Clean Water Act. The U.S. Environmental Protection Agency also has responsibility for oversight and review of permits and actions, which affect waters of the United States. There is one natural spring in proximity to the project site; thus the topic of water resources was retained for further analysis.

Cultural Resources

6) Archeological Resources

Section 106 of the National Historic Preservation Act, as amended in 1992 (16 USC 470 *et. seq.*); the NPS's Director's Order 28 *Cultural Resource Management Guideline*; and NPS 2006 Management Policies require the consideration of impacts on historic properties that are listed, or eligible to be listed, in the National Register of Historic Places. The National Register is the nation's inventory of historic places and the national repository of documentation on property types and their significance. The above-mentioned policies and regulations require federal agencies to coordinate consultation with the State Historic Preservation Officer regarding the potential effects to properties listed on or eligible for the National Register of Historic Places.

The NPS, as steward of many of America's most important cultural resources, is charged to preserve historic properties for the enjoyment of present and future generations. Management decisions and activities throughout the National Park System must reflect awareness of the irreplaceable nature of these resources. The NPS will protect and manage cultural resources in its custody through effective research, planning, and stewardship in accordance with the policies and principles contained in the NPS 2006 Management Policies, federal laws, and the appropriate Director's Orders. The replacement of the treatment and disposal system would require excavation, potentially disturbing archeological resources. Therefore, archeological resources will be further analyzed.

Social Issues

7) Visitor Use Experience

NPS 2006 Management Policies states the fundamental purpose of all parks is for the enjoyment of park resources and values by the people of the United States. NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks, and will provide opportunities specifically suited for the natural and cultural resources found within the park. In the long-term, the treatment and disposal method replacement for the wastewater system would be a beneficial improvement for the visitor experience. Some temporary disturbance would be visible to visitors, but would be minor and would have little effect to visitor experience. Although, it is estimated that impacts to visitor use and experience would be short-term, minor

further analysis is proposed due to the importance of providing a quality and safe experience in WUPA. Thus, visitor use experience will be analyzed in detail.

8) Visual Resources

NPS 2006 Management Policies states that scenic views and visual resources are considered highly valued associated characteristics that the NPS should strive to protect. The current evaporative lagoons are located in the viewshed of the monument and the primary view from the visitor center. The treatment and disposal method replacement for the wastewater system would be a beneficial improvement by restoring the landscape and viewshed to natural conditions. Therefore, this topic will be further analyzed.

9) Public Health and Safety

NPS 2006 Management Policies states park managers should strive to protect human life, by providing injury free visits and a safe and healthful environment for visitors and employees. Replacing the treatment and disposal method for the wastewater system would reduce the level of maintenance and exposure to raw sewage by the employees. Therefore impacts to public and health safety will be further analyzed.

1.8 Impact topics Considered, but Dismissed from Further Analysis

Impact topics for this project have been identified on the basis of federal laws, regulations, and orders, including the NPS 2006 Management Policies, and NPS knowledge of resources at WUPA. Impact topics that are not carried forward for further analysis in this Environmental Assessment are those where the proposed action would have a minor impact. The rationale for not retaining each of the specific topics is listed below with a description of the existing setting or baseline conditions within the project area. The following impact topics were dismissed for further analysis:

- 1) Wetlands, Floodplains, and Riparian Areas
- 2) Historic Resources
- 3) Cultural Landscapes
- 4) Ethnographic Resources
- 5) Paleontological Resources
- 6) Museum Collections
- 7) Park Operations
- 8) Air Quality
- 9) Soundscape Management
- 10) Lightscape Management
- 11) Socioeconomics
- 12) Prime and Unique Farmlands
- 13) Indian Trust Resources
- 14) Environmental Justice
- 15) Wilderness
- 16) Invasive Plant Species

1) Wetlands/Floodplains

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 of dredged or fill material or excavation within waters of the United States. NPS policies for wetlands as stated in 2006 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 project site is not in proximity to any wetlands, and no adverse impacts as described in DO 77-1 are expected. Therefore, no Statement of Findings will be prepared and the topic of wetlands was dismissed from further analysis.

Executive Order 11988 *Floodplain Management* requires all federal agencies to avoid construction within the 100-year floodplain unless no other practicable alternative exists. The NPS guided by the 2006 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. The project site is not within a 100 year floodplain, and downstream floodplain function would not be affected. Therefore a Statement of Findings for floodplains will not be prepared, and the topic of floodplains was dismissed from further analysis.

2) Historic Resources

The term "historic structures" refers to both historic and prehistoric structures, which are defined as constructions that shelter any form of human habitation or activity. The WUPA Visitor Center Complex Historic District is eligible to be listed on the National Register list, because it represents both the rustic style architecture of the Civilian Conservation Corps (CCC) and the NPS modern style architecture for the Mission 66 program (NPS 2007). Some ground disturbance would occur from the proposed treatment and disposal system replacement project within the WUPA Visitor Center Complex Historic District. The disturbance would be temporary with beneficial permanent visible changes with the removal of the evaporative sewer lagoons, and all new structures would be underground. The proposed wastewater improvements would benefit the historic resources by preventing future sewage leaks into buildings, and enhancing the viewshed. Impacts to historic resources would be negligible and minimal; thus historic resources were dismissed from further analysis.

3) Cultural Landscapes

The National Park Service defines cultural landscapes as settings humans create in the natural world. They are intertwined patterns of things both natural and constructed, expressions of human manipulation and adaptation of the land (NPS's Director's Order 28 *Cultural Resource Management Guideline*). The Flagstaff Area Monuments have recently completed Cultural Landscape Inventories for WUPA (NPS 2007). These inventories assess the character of the natural world that includes and encompasses historic districts. Such inventories describe a landscape's physical development over time, and evaluate its significance and integrity. The project area does not have any cultural landscapes eligible for listing on the National Register of Historic Places. There are no cultural landscapes within the project area; thus cultural landscapes have been dismissed from further analysis.

4) Ethnographic Resources

Director's Order 28 (DO-28), *Cultural Resource Management*, defines ethnographic resources as any site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a an associated traditional group. According to DO-28 and Executive Order 13007, *Indian Sacred Sites*, the NPS should preserve and protect ethnographic resources. There are no known ethnographic resources within the proposed project area. The proposed wastewater system project would be designed to minimize any impacts to natural resources and to restore native plant communities that could be identified as ethnographic resources. If projects are proposed that would significantly alter the physical characteristics of a site all the tribes claiming cultural affiliation to the monuments will be notified and given at least 30 days notice to respond. However, the proposed project would have negligible effects on ethnographic resources; thus ethnographic resources were dismissed from further analysis.

5) Paleontological Resources

The 2006 Management Policies for the National Park Service (NPS) states the paleontological resources (fossils), including both organic and mineralized remains in body or trace form, will be protected, preserved, and managed for public education, interpretation, and scientific research. The surface geologic deposits in proximity to the project site are formed by very recent volcanic deposits with limited post eruption alluvial, colluvial, and aeolian processes that are not conducive to the preservation of paleontological resources. Some strata of the underlying Moenkopi Formation have sparse fossils. However, the Moenkopi strata are at sufficient depth they are likely to be minimally disturbed, and fossils have not been documented during prior surveys of nearby outcrops around the project site. Therefore, there would be no likely impacts to paleontological resources as a result of the proposed project and the topic was dismissed from further assessment.

6) Museum Collections

The Director's Order 24 *Museum Collections* states that NPS is required to consider the 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, NPS museum collections. No WUPA museum collection items would be disturbed as a result of this project. Therefore, museum collections were dismissed from further analysis.

7) Park Operations

Park operations include changes that may affect the current facilities or that may require a new level of maintenance or staffing. The proposed action would improve the current wastewater system and reduce the potential level of maintenance at the site. The proposed action would not significantly change overall park operations, but would enable the park to more effectively manage solid waste for increased annual visitation and residential housing. Therefore, park operations were dismissed from further analysis.

8) Air Quality

The Clean Air Act of 1963 (42 U.S.C. 7401 *et seq.*) established federal programs that provide special protection for air resources and air quality related values associated with NPS units. Specifically, Section 118 of the Clean Air Act requires a park unit to meet all federal, state, and local air pollution standards. WUPA is designated as a Class II air quality area under the Clean Air Act, which means emissions of particulate matter and sulfur dioxide are allowed up to the maximum increase in concentrations of pollutants over baseline concentrations as specified in Section 163 of the Clean Air Act. In addition, the Clean Air Act gives the federal land manager the responsibility to protect air quality related values (i.e., visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse pollution impacts.

Motor exhaust and fugitive dust caused by a backhoe or other mechanical equipment used during the treatment and disposal system replacement project would be negligible and temporary. The Class II air quality designation would not be affected by the project. Therefore, air quality was dismissed as an impact topic for further analysis.

9) Soundscape Management

In accordance with the 2006 Management Policies for the NPS and Director's Order 47 *Sound Preservation and Noise Management*, an important component of the NPS's mission is the preservation of natural soundscapes associated with national park units (NPS 2006). Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the combination of all the natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. The frequencies, magnitudes, and durations of human-caused sound considered acceptable varies among NPS units as well as potentially throughout each monument, being generally greater in developed areas and less in undeveloped areas.

Impacts to the soundscape could occur from equipment (e.g., backhoe) used for trenching and installing the septic tanks. These impacts should be minor and temporary and should not exceed the typical levels of man-made noise present during visitor season. Therefore, soundscape management was dismissed as an impact topic for further analysis.

10) Lightscape Management

The 2006 Management Policies for the NPS states the NPS will strive to preserve natural ambient landscapes, which are natural resources and values that exist in the absence of human caused light (NPS 2006). WUPA strives to limit the use of artificial outdoor lighting to the amount necessary for basic safety requirements. There should be no impacts to lightscape management; thus, this topic was dismissed from further analysis.

11) Socioeconomics

The proposed action would neither change local and regional land use nor appreciably impact local businesses or other agencies. There could be minimal increases in employment opportunities and revenue generated in nearby small businesses from implementation of the proposed action. Any increase in workforce and revenue would be temporary and negligible. Because the impacts to the socioeconomic environment would be negligible, this topic was dismissed from further analysis.

12) 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). Prime farmland is defined as land that has the best combination of physical and chemical properties for producing food, forage, fiber, and oil seed, and for other uses (e.g., pasture land, forest land, and crop land). Unique farmland is defined as land other than prime farmland that can produce high value and fiber crops, such as fruits, vegetables, and nuts. There are no prime and unique farmlands designated in the WUPA; thus this topic was dismissed from further analysis.

13) Indian Trust Resources

Secretarial Order 3175 mandates any anticipated impacts to Indian trust resources from 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 WUPA. Therefore, the project would have negligible effects on Indian trust resources, and was dismissed from further analysis.

14) 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, policies, and activities on minorities and low-income populations and communities. The proposed action would not have disproportionate health or environmental effects on minorities or low-income populations or communities. Therefore, environmental justice was dismissed from further analysis.

15) Wilderness

The 2006 Management Policies, Section 6 states, “The National Park Service will evaluate all lands it administers for their suitability for inclusion within the national wilderness preservation system. For those lands that possess wilderness characteristics, no action that would diminish their wilderness suitability will be taken until after Congress and the President have taken final action. The superintendent of each park containing wilderness will develop and maintain a wilderness management plan to guide the preservation, management, and use of the park’s wilderness area, and ensure that wilderness is unimpaired for future use and enjoyment as wilderness.”

There are no lands designated as wilderness in or near the WUPA project area. However, there are three separate roadless areas within WUPA. The project would not be implemented in proximity to any of these roadless areas. Thus, wilderness was dismissed for further analysis.

16) Invasive Plant Species

There is a risk of invasive species introduction and spread associated with any construction or ground disturbing activity. However, the proposed action would result in a relatively small area of disturbance. There are sufficient mitigating measures to reduce the potential for introduction of new invasive plants. The NPS actively monitors for problem species around the WUPA facility area, and has staff dedicated to the control and removal of problem species if they are introduced. Therefore, invasive plant species were dismissed from further analysis.

2.0 ALTERNATIVES CONSIDERED

2.1 Alternative I: No Action Alternative

This action represents the conditions that would continue to exist if the treatment and disposal method (i.e., leachfield construction, evaporative lagoons removal) was not replaced. This alternative provides a baseline for comparing and evaluating the impacts to the environment by the action alternatives. Under this alternative, the wastewater system would continue to have compliance and operational problems due to the evaporative lagoons being undersized compared to the demands, and maintenance and repairs would occur on an as needed basis. Failure to rehabilitate the wastewater system with a new treatment and disposal method could result in

violations of Federal and State of Arizona wastewater discharge regulations, and subsequent facility closure, including restrooms in the Visitor Center and residential housing within the park.

2.2 Alternative II: Preferred Alternative

The Preferred Alternative proposes to replace the treatment and disposal method on the existing wastewater system (Figure 2 & Figure 3). The proposed action would remove the existing septic tanks, manholes, pits, distribution box, and gravity sewer pipes leading to the evaporative lagoons and the abandoned drainfield. The proposed action would include installing one 12, 000 gallon septic tank (36' x 8'), one 3, 000 gallon recirculation tank (16' x 6'), and one 1,000 gallon discharge septic tank (10' x 5.5'). Septic tank installations would include excavating with a backhoe approximately 8 feet deep and up to 20 feet wide around the edge of each septic tank.

The installation of the new low pressure sewer main would require installing approximately 230 linear feet of 2-1/2", 34 linear feet of 4", and 25 linear feet of 6" PVC sewer pipes with a minimum 0.9% slope. The earthwork and clearing of vegetation for the proposed sewer alignment, and drainfield would be limited to a 16 foot wide corridor. The installation would include excavating and trenching with a backhoe. The trench walls would require excavating from the bottom of the trench to approximately 12" higher than the top of the pipe on each side of the pipe. If there is rock or unyielding bearing material encountered, then the trenches would be excavated 6" deeper to allow for bedding course with initial backfill. The new gravity sewer pipes would be connected to the existing wastewater system and the new drainfield.

The fabric filtration system, Advantex AX-100, would consist of four Advantex filter pods, an air inlet, and a 4" filtrate return line connected to the recirculation tank. Two 50 gpm (1/2 Hp) pumps would recirculate the wastewater between the fabric filtration system and recirculation tank.

The drainfield would be located approximately 230 feet south of the proposed septic tank, recirculation tank, and filtration system. The installation of 608 linear feet of sub-surface wastewater drainfield chambers would require excavation with a backhoe between 12" and 36" deep and a minimum 3' wide trench. The chambers installed would be approved by the Arizona Department of Environmental Quality and would be molded high-density polyethylene domed chambers with open bottoms. They would have louvered sidewalls to allow for effluent to pass laterally into the soil. The earthwork and clearing of vegetation would be limited to a 20 foot wide perimeter around the drainfield.

The electrical utilities would include a power conduit, power cable, communication cable, communication conduit, ground cables, pull boxes, mechanical transfer switch and appurtenances to supply power to the control panel. Two control panels would be constructed for the proposed action; one for each duplex pump system located within the 1, 000 gallon discharge septic tank and the 3, 000 gallon recirculation tank. The control panels and station would be connected to an existing service panel.

The sanitary wastewater utilities to be installed would include approximately 2 lateral cleanouts for the drainfield. Each cleanout would require a concrete pad approximately 18' square and 4'

deep at the ground surface. No manholes are proposed, but if necessary would be precast concrete approximately 48" in diameter and 24' to 30' in depth. The manhole frame and lid would be 3" above the surface in open areas and level with the surface in roadways. Each manhole lid would have "sanitary sewer" cast into it. Excavation for each manhole would require trenching 12" to 24" deep with a backhoe.

The existing utilities and below-grade utility structures of the current treatment and disposal system that are 5 feet outside the new construction footprint would be removed. Utilities outside the 5 foot buffer would be abandoned in accordance to NPS standards. The contents from the septic tank, manholes, and drainfields would be pumped and disposed off-site in an approved EPA landfill. In addition, the soils within 5 feet of the demolished structures would be excavated and disposed off site at an approved location. All septic tanks and manholes removed include the entire depth of the structures and associated piping. All manholes no longer in use would be abandoned by removing the frames and lids and disposed at an approved location. The manholes would then be crushed and filled in with gravel. The existing evaporative lagoons would be abandoned on site by filling in the site with backfill material after the sewage has been pumped and removed.

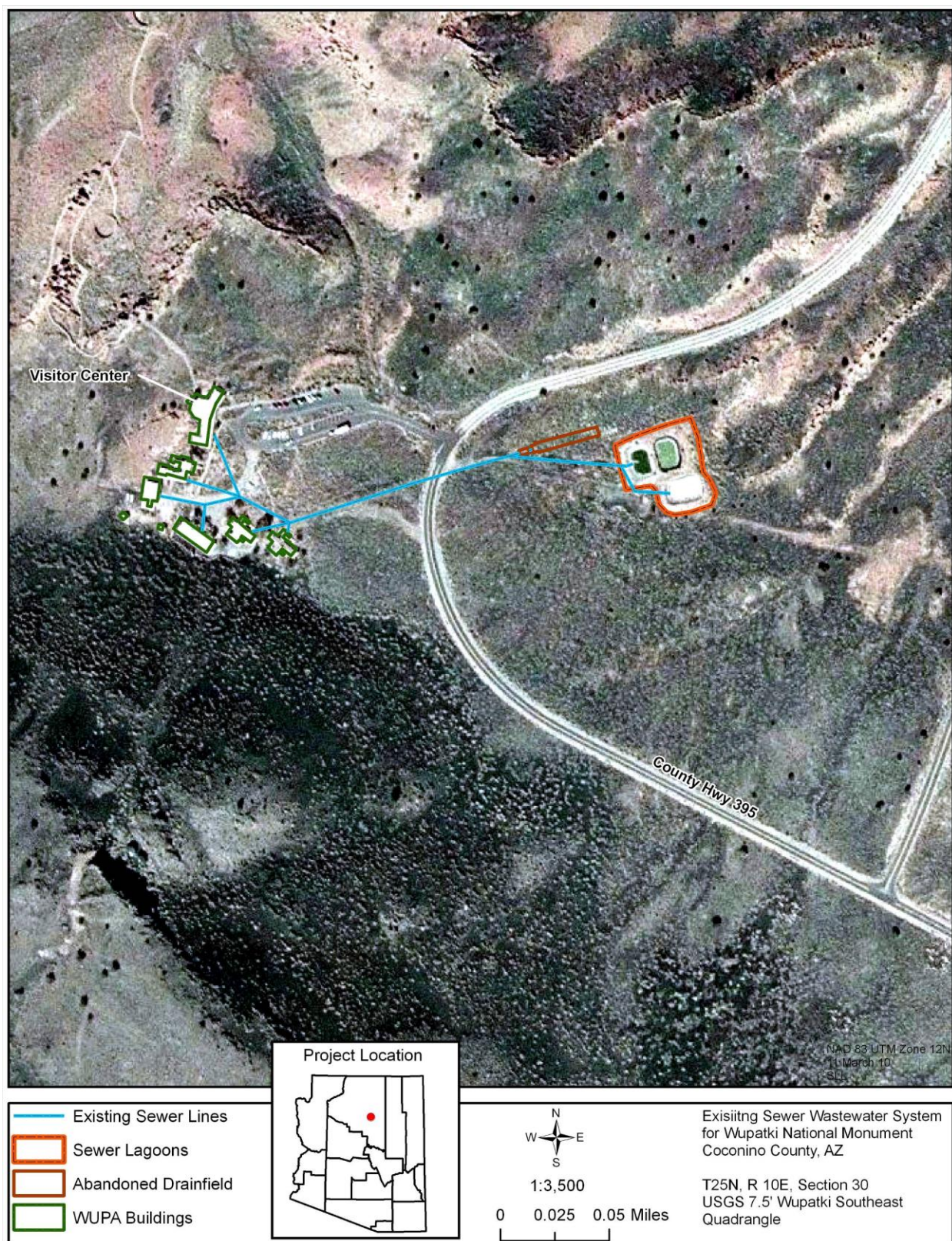


Figure 2. Existing Wastewater System for the WUPA Visitor Center.

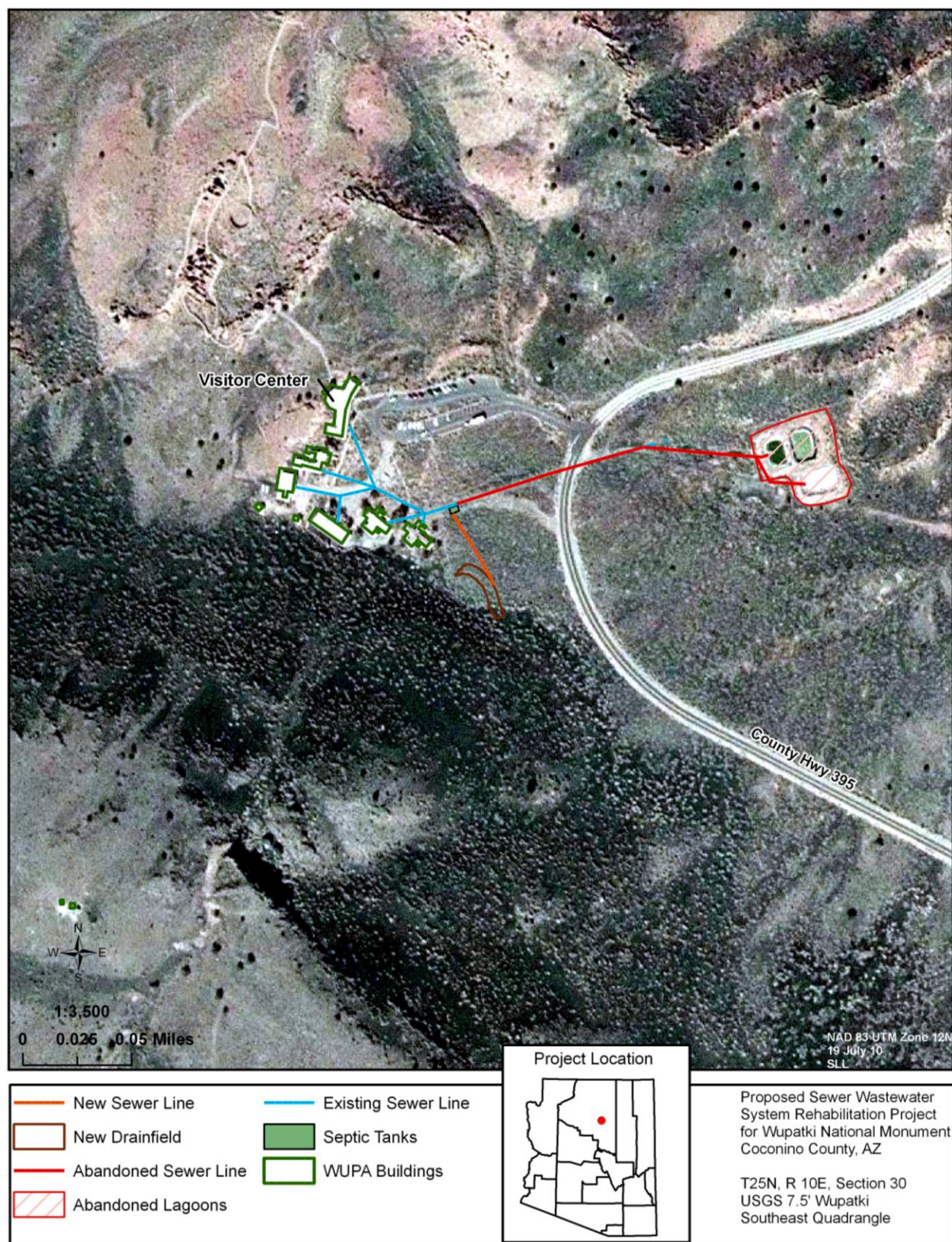


Figure 3. Proposed Wastewater System Rehabilitation for the WUPA Visitor Center.

2.2.1 Alternatives Considered and Rejected

Four additional alternatives (Alternatives III – VI) were considered, but rejected based on costs, not enhancing the viewshed, or not improving the current wastewater system. Three potential sub-surface wastewater infiltration system (SWIS) disposal field locations and two surface wastewater disposal (i.e., evaporative lagoons) locations were evaluated. All alternatives used a conventional 12,000 gallon dual compartment septic tank for removal of solid waste before subsurface or surface wastewater disposal.

Alternative III was a non- pressurized sub-surface disposal system and would be located across County Highway 395 from the WUPA Visitor Center. Alternative III would use a gravity-flow system to deliver the wastewater to the SWIS. The non- pressurized sub-surface disposal system included a 12,000 gallon dual compartment septic tank and SWIS to remove the solids, and treats the wastewater anaerobically. This alternative was rejected from further consideration, because the system design has all ready been used at this location and failed. Additionally, the wastewater does not infiltrate due to a shallow bedrock layer, and the wastewater effluent plume starts to migrate horizontally into a nearby canyon.

Alternative IV, a non-pressurized sub-surface disposal system, was the same as alternative III, but located at the NPS New Heiser Administrative Area. The New Heiser SWIS location is approximately two miles southeast of the visitor center, and a sewer main would be required to transport the effluent. This alternative was rejected from further consideration, because the capital and operational costs were higher than the Preferred Alternative due to the two mile long sewer main.

Alternative V would use a 12,000 gallon dual compartment septic tank with wastewater being disposed at an existing evaporative sewer lagoon. The new treatment and disposal system would be located at the NPS New Heiser Administrative Area, which is approximately two miles southeast of the visitor center. A sewer main would be required to transport the effluent. This alternative was dismissed, because the capital and operational costs were higher than the Preferred Alternative due to the two mile long sewer main, and the existing evaporative lagoon is undersized to meet the wastewater demands of the WUPA Visitor Center.

Alternative VI would rehabilitate the existing evaporative lagoons and septic tank. The system would require a 12,000 gallon dual compartment septic tank with wastewater being disposed at an existing evaporative lagoon. This alternative was dismissed, because the evaporative lagoon would remain in the viewshed from the visitor center, and the design and construction of the evaporative lagoon was poorly done, which would continue to have a variety of compliance and operational problems.

2.3 Mitigation Measures during Construction of the Proposed Action

The following mitigation measures would be implemented:

- All construction would be limited to the areas within the construction limits; all activity, including vehicle and material use and storage would not be allowed outside predetermined, marked construction/staging zones and would be within the project area.

- Traffic controls would be installed to protect pedestrians; barricades, lights, danger signals, and warning signs would be used; and pipes, hoses, and power lines crossing sidewalks and walkways would be covered with troughs using beveled edge boards.
- Temporary toilets, and wash facilities for use by construction personnel would be located in areas secluded from the public, and would be cleaned weekly.
- All earth-moving equipment including haul vehicles would be thoroughly cleaned of mud and weed seed prior to entering the National Park.
- The NPS actively monitors for invasive plant species around the WUPA facility area, and has staff dedicated to the control and removal of problem species if they are introduced.
- If fuels and hazardous materials are used, a spill-protection plan must be prepared.
- Erosion and sediment control measures would be installed to prevent soil erosion and discharge of soil-bearing water runoff or dust to adjacent areas. Temporary silt fences would be installed around stockpiles and/or excavated material that cannot be backfilled within the same day excavated; downstream of any utility trench that has not been backfilled; and prior to leaving the work site for the day. Barriers would be installed around excavations and sub-grade construction to prevent flooding by runoff from storm water or heavy rains.
- Excavated soil may be used in the construction project; excess soil would be stored in approved areas and covered to prevent windblown dust.
- Topsoil would be removed and conserved separately then placed back on top after the work is completed. Materials would be stockpiled away from the edge of excavation and not placed within the drip line of the remaining trees.
- Where trenching has occurred, the surface of the trench would be left adequately mounded to allow for ground settling along the line. Park inspection of all fill, gravel or soil materials into WUPA would be required. Trenches left open would be fenced to protect the public.
- Areas to be cleared would take precautions to protect the existing vegetation. Temporary barriers to protect existing trees, plants, and root zones would be provided. Excavation near trees would be carefully supervised to prevent damage. Fill material would be placed in depressions caused by clearing or grubbing unless further excavation or earthwork is indicated.
- If during construction previously undiscovered archeological resources are discovered, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented and an appropriate mitigation strategy developed in consultation with the State Historic Preservation Officer.
- Project ground-disturbing activities (i.e., excavations, removal and installation of sewer pipes) will be monitored by an archaeologist. Spot monitoring would continue for the duration of the entire project.
- Site disturbance, including earthwork and clearing of vegetation, would be limited to a 10 foot wide corridor along the proposed new sewer line alignment and a 20 foot wide corridor around proposed septic tanks and drainfield.

- All work would be conducted during normal Park operation hours, Monday – Friday, and workers would commute to and from the site each day and be confined to the day’s work area.
- The NPS will designate a specific area(s) for sorting waste materials as reuse, salvage, recyclable, or debris. Waste and recycling bins would be provided and placed near each other close to the point of waste generation. Each bin would be clearly labeled to avoid confusion. All recyclable material and debris would be transported off project site by the contractor and disposed at approved locations (i.e., landfills, incinerators).

2.4 Environmentally Preferred Alternative

The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act of 1969 (NEPA), which is guided by 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.” Section 101 of the National Environmental Policy Act states that “...it is the continuing responsibility of the Federal Government to:

- (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
- (3) attain the widest range of beneficial uses of the environment without degradations, risk to health or safety, or other undesirable and unintended consequences;
- (4) preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment which supports diversity and variety of individual choice;
- (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life’s amenities;
- (6) enhance the quality of renewable resources and approach the maximum attainable recycling of resources.”

The Preferred Alternative meets all six criteria, while the No Action Alternative does not (Table 1). The Preferred Alternative would accomplish criteria 1, 2, and 3 by preventing sewage pollution, or the potential of sewage pollution into the soils and groundwater. Criteria 2 and 4 are fulfilled by providing long-term maintenance solutions and protecting the WUPA Visitor Center Complex Historic District. The proposed treatment and disposal method replacement of the wastewater system would allow the system to handle the increased sewage demands due to increased annual visitation numbers and; thus fulfilling criteria 5. The No Action alternative would not meet any of the criteria, because potential for sewage backups into the historic district would remain. Neither alternative would achieve criteria 6. Therefore, the Preferred Alternative is the environmentally preferred alternative.

Table 1. Summary of the Proposed Action Objectives and Alternatives

Objectives	No Action Alternative	Preferred Alternative
Replace aging and inadequate treatment and disposal method (i.e., sewer lagoons) of wastewater system	The treatment and disposal method would not be replaced and would continue to be maintained on an as need basis.	The treatment and disposal method of the wastewater system would be replaced.
Make changes to wastewater sewer system to meet ADEQ and US Public Health Services standards	The sewer lagoons would remain too small to meet the current volume of sewage demands and would continue to expose employees to raw sewage which would not meet the standards.	The treatment and disposal method would be replaced and would meet the standards.
Improve employee health and safety by eliminating handling of raw sewage and eight confined spaces	The system would not be rehabilitated and would continue to expose employees to raw sewage and confined spaces.	The treatment and disposal method would be replaced, which would have the capability and capacity to handle the volume of sewage demands and would eliminate employee exposure to raw sewage and confined spaces.
Enhance the visitor experience by restoring the landscape and viewshed to natural conditions	The sewer lagoons would remain in the viewshed from the WUPA Visitor Center.	The sewer lagoons would be removed and the new treatment and disposal structures would be underground, which would restore the landscape and viewshed to natural conditions.
Does the alternative meet project objectives	No	Yes

3.0 AFFECTED ENVIRONMENT

NEPA requires that environmental documents disclose the environmental impacts of the proposed federal action, reasonable alternatives to that action, and any adverse environmental effects that cannot be avoided should the preferred alternative be implemented. This chapter identifies the impacts to the physical, biological, and human aspects of the environment that could be affected by the alternatives. The effects of project alternatives on each resource are also described.

This chapter analyzes the potential environmental consequences, or impacts, that would occur as a result of replacing the existing wastewater system as described in the previous chapter. Topics analyzed in this chapter include:

- 3.6) Natural Resources
 - 3.6.1) Geologic Resources and Soils
 - 3.6.2) Vegetation
 - 3.6.3) Wildlife
 - 3.6.4) Special Status Species
 - 3.6.5) Water Resources
- 3.7) Cultural Resources
 - 3.7.1) Archeological Resources
- 3.8) Social Issues
 - 3.8.1) Visitor Experience
 - 3.8.2) Visual Resources
 - 3.8.3) Public Health and Safety

3.1 Methodology

The effects of each alternative are assessed for direct, indirect, and cumulative effects for each resource topic selected. Actions are first analyzed for their direct and indirect effects. Direct effects are impacts that are caused by the alternatives at the same time and in the same place as the action. Indirect effects are impacts caused by the alternatives that occur later in time or are farther in distance than the action. Potential impacts are described in terms of type, context, duration, and intensity. Specific impact thresholds are given for each resource at the beginning of each resource section. General definitions for potential impacts are described as follows:

Type: Describes the impact as either beneficial or adverse:

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.

Context: Describes the location or area where the impacts will occur.

- 1) site-specific - impacts would occur within the location of the proposed action
- 2) local – impacts would affect areas within the location of the proposed action and land adjacent to the proposed action
- 3) regional – impacts would affect areas within the location of the proposed action, land adjacent to the proposed action, and land in surrounding communities.

Duration: Describes the length of time an impact would occur, as either short-term or long-term.

Short-term: impacts that generally last for the duration of the project. Some impact topics will have different short-term duration measures and these will be listed with the resource.

Long-term: impacts that generally last beyond the duration of the project. Some impact topics will have different long-term duration measures and these will be listed with the resource.

Intensity: Describes the degree, level, or strength of an impact. The impacts can be *negligible*, *minor*, *moderate*, or *major*. Definitions of intensity can vary by resource topic and are provided separately for each impact topic analyzed.

3.2 Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations, which guide the implementation 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 are considered for all Alternatives.

Cumulative impacts were determined by combining the impacts of the alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects at WUPA and, if applicable, in the surrounding region. The geographic scope for this analysis includes elements within the WUPA visitor center complex and areas adjacent. The following are past, present and reasonably foreseeable future actions that have and could occur in the vicinity of the project area:

- Remodel/rehab of the WUPA visitor center, residence building 1, and closed room (scheduled for 2009)
- Plan, design and construct WUPA historic stone signs (scheduled for 2010)
- Continue to provide access to sensitive/closed WUPA backcountry areas in coordination with park staff (2009-2015)
- Complete a disturbed lands/abandoned roads inventory & restoration prioritization
- Install alarm system at WUPA Visitor Center
- New activities proposed in the 2002 General Management Plan and Final Environmental Statement (NPS) included constructing a new north entrance contact station, and constructing new trails.

3.3 Impairment

The 2006 NPS Management Policies requires the analysis of potential effects to determine whether or not actions would impair park resources. 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. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, actions that would adversely affect park resources and values. However, these laws give the NPS the management discretion to allow impacts to park resources and values when necessary or appropriate to fulfill

the purpose of the park, as long as the impact does not constitute impairment of the affected resources or values.

Although Congress has given the National Park Service the management discretion to allow certain impacts within parks, 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 states otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute an impairment. Impairment may result from NPS activities in managing the park, from visitor activities, or from activities undertaken by concessionaires, contractors, and others operating in the park. 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 to opportunities for enjoyment of the park; or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

Each resource topic was analyzed to determine if impacts constituted an impairment to park resources and values.

3.4 Impacts to Cultural Resources and Section 106 of the National Historic Preservation Act

In this Environmental Assessment, impacts to cultural resources are described in terms of type, context, duration, and intensity, as described above, which is consistent with the regulations of the Council on Environmental Quality (CEQ) that implement the National Environmental Policy Act (NEPA). This Environmental Assessment is intended, however, to comply with the requirements of both NEPA and §106 of the National Historic Preservation Act (NHPA). To achieve this, a §106 summary is included under the Preferred Alternative for each of the cultural resource topics carried forward including Cultural resources. The topics of historic resources, cultural landscapes, ethnographic resources, and museum collections were dismissed from further consideration, because none were identified in the project area or impacts would be negligible. Should the proposed action be determined to potentially affect cultural resources, site specific compliance with §106 of the National Historic Preservation Act will be initiated with the park's affiliated tribes as well as the Arizona State Historic Preservation Officer (AZSHPO).

In accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 of the NHPA (36 CFR Part 800), Protection of Historic Properties, impacts to historic properties were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that were either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of

adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register; and (4) considering ways to avoid, minimize or mitigate adverse effects.

In accordance with the Advisory Council's regulations implementing §106 of the NHPA (36 CFR Part 800), CEQ regulations and the NPS's *Conservation Planning, Environmental Impact Analysis and Decision-Making* (Director's Order #12) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact (e.g. reducing the intensity of an impact from major to moderate or minor). Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by §106 is similarly reduced. Although adverse effects under §106 may be mitigated, the effect remains adverse.

Under the Advisory Council's regulations, a determination of either *adverse effect* or *no adverse effect* must be made for affected historic properties that are eligible for or listed on the National Register of Historic Places. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the National Register (e.g. diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association). *Adverse effects* also include reasonably foreseeable effects caused by the Preferred Alternative that would occur later in time; be farther removed in distance; or be cumulative (36 CFR Part 800.5, Assessment of Adverse Effects). A determination of *no adverse effect* means there is an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the National Register of Historic Places.

In order for a historic property to be listed on the National Register of Historic Places, it must meet one or more of the following criteria of significance: 1) associated with events that have made a significant contribution to the broad patterns of our history; 2) associated with the lives of persons significant in our past; 3) embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable distinction; 4) have yielded, or may be likely to yield, information important in prehistory or history. In addition, the historic property must possess integrity of location, design, setting, materials, workmanship, feeling, association (*National Register Bulletin, How to Apply the National Register Criteria for Evaluation*).

3.5 Summary of Environmental Consequences of the Alternatives

Table 2 summarizes the environmental effects on resource topics analyzed in the environmental assessment.

Table 2. Summary of Environmental Impacts by Alternatives

Resource Topic	Alternative I No Action	Alternative II Replacement of wastewater system
Geologic and Soil Resources	Minor to moderate , long-term, adverse, and local impacts due to the potential for sewage contamination to soil resources.	Direct, minor, short-term to long-term, adverse, and local impacts due to temporary disturbance from trenching and soil would not be replaced where new drainfield was constructed.
Vegetation Resources	Direct, negligible to minor, adverse, short-term, and site-specific due to potential for repairs and maintenance on as need basis disturbing individual plants.	Direct, negligible to minor, adverse, short-term to long-term, and site-specific due to impacts to individual shrubs combined with the small area to be disturbed should not affect the plant population, vegetation communities, or ecological processes in WUPA, and long-term due to individual plants will not be able to regrow where new facilities are constructed.
Wildlife	Negligible, adverse beneficial, short-term and long-term, and site-specific due to infrequent disturbance from noise and human presence for potential repairs and/or maintenance.	Negligible, short-term and long-term, adverse or beneficial, site-specific impacts to wildlife species or their habitats due to noise disturbance and human presence during construction. Long-term impacts to wildlife habitat due to potential loss of habitat from placement of permanent structures (e.g., drainfield) within the project area.
Special Status Species	Wupatki pocket mouse - Negligible, adverse, short-term and long-term, and site-specific impacts due to infrequent disturbance from noise and human presence for potential repairs and/or maintenance.	Wupatki pocket mouse - minor, short-term, adverse impacts and minor, long-term beneficial impacts to Wupatki pocket mouse individuals, populations, or habitat due to noise disturbance, human presence, and soil disturbance; and

	<p>Townsend's big-eared bat (<i>Corynorhinus townsendii</i> spp. <i>pallascens</i>), spotted bat (<i>Euderma maculatum</i>), Western small-footed myotis (<i>Myotis ciliolabrum</i>), and fringed myotis (<i>Myotis thysanodes</i>) - negligible to minor, beneficial, short-term and long-term impacts due to the continued use of the existing lagoons as artificial habitat for insect foraging and as a source of water; and they are mostly nocturnal and would not be active during routine maintenance and repairs to the existing infrastructure.</p>	<p>construction activities may result in mortality for a few individuals. Long-term impacts to Wupatki pocket mouse habitat due to potential loss of habitat from placement of permanent structures (e.g., drainfield) within the project area.</p> <p>Townsend's big-eared bat (<i>Corynorhinus townsendii</i> spp. <i>pallascens</i>), spotted bat (<i>Euderma maculatum</i>), Western small-footed myotis (<i>Myotis ciliolabrum</i>), and fringed myotis (<i>Myotis thysanodes</i>) - minor, long-term, adverse impacts due to the possible displacement of some individuals from using the existing lagoon area;</p>
Water Resources	<p>Indirect, minor, short-term to long-term depending on how quickly a leak was detected, adverse, and local impacts due to the high potential for future sewage leaks and overflows.</p>	<p>Direct, moderate, long-term, beneficial, and local impacts due to the reduced potential for sewage leaks, and the wastewater system would meet Arizona Depart. of Environmental Quality and U.S. Public Health and Safety standards.</p>
Archaeological Resources	<p>Direct, minor, adverse, long-term, and site-specific impacts due to low potential for encountering artifacts. The soil was disturbed during installation of the existing wastewater system and there are no known sites within the project area based on current knowledge.</p>	<p>Direct, minor, long-term, adverse, and site-specific due to most of the soil disturbance would occur in previously disturbed areas from trenching for the existing sewer lines and soil disturbance, including clearing of vegetation, would be limited to a 10 foot width corridor along the proposed sewer line alignment and to a 20 foot wide perimeter around proposed septic tanks and drainfields. Also, there</p>

		are no previously recorded archeological artifacts or sites within the undisturbed areas from past inventory.
Visitor Use	Indirect, minor, long-term, adverse, and local impacts due to the continued manually pumping of the sewer lagoons to achieve effluent leveling and blocked pipes, which could result in the closure of the visitor center, because of violations to the Arizona Depart. of Environmental Quality and U.S. Public Health and Safety standards.	Direct, minor, short-term, beneficial, and local due to visual quality, noise, and disturbance encounter levels within the visitor center area during construction. The visitor center would remain open during the entire proposed action. The alternative would be beneficial due to the ability of the wastewater system to accommodate the current and future wastewater use for visitors, employees, and residents, and would enhance visitor experience by restoring the landscape to more natural conditions.
Visual Resources	Indirect, moderate, long-term, adverse, and local due to evaporative sewer lagoons would remain in the viewshed of the monument and the primary view from the WUPA Visitor Center.	Direct, minor to major, short-term to long-term, beneficial, and local due to the restoration of the landscape and viewshed to natural conditions, which would also enhance the visitor experience. The potential impacts to visual resources during installation would be temporary and short-term, because the revegetation plan implemented for the disturbed area would make the visual impacts less obvious in the landscape and construction should take approximately 2 months.
Public Health and Safety	Minor to moderate, long-term, adverse, local impacts due to the continued blocked pipes, employee exposure to raw sewage, and meeting the	Direct, moderate, long-term, beneficial, and local impacts due to replacement of the existing treatment and disposal methods (i.e., sewer

	Arizona Depart. of Environmental Quality and US Public Health Service standards	lagoons) would comply with the US Public Health Services standards; would be able to accommodate the current and future wastewater use for visitors, employees, and residents; and would eliminate handling of raw sewage by employees and eight confined spaces (manholes).
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3.6 Natural Resources

3.6.1 Geologic Resources and Soils

The 2006 Management Policies for the National Park Service states the NPS will preserve and protect geologic features and processes from disturbances (NPS 2006). These policies also state NPS will aim to understand and preserve the soil resources and to prevent unnatural erosion, removal, or contamination of them. The proposed treatment and disposal method replacement would require excavating and backfilling for utility trenches and structures and topsoil removal for site clearing. A total of 21,344 square feet would be disturbed by constructing and operating the new system, a measurable impact on the soil resources.

3.6.1.1 Affected Environment

Wupatki (WUPA) lies near the northeastern edge of the San Francisco volcanic field, which covers approximately 1,800 square miles of the southern Colorado Plateau in north-central Arizona (Priest et al. 2001). Black Point Basalt, the oldest volcanic rock in Wupatki, is found in the western part of WUPA and forms west, north, south, and east mesas (Billingsley et al. 2007). This geologic unit typically supports light to moderate growth of sagebrush, cactus, juniper, and grasses (Billingsley et al. 2007).

WUPA has a diverse and complex geology with varied substrate, which influences the vegetation and plant communities found within the monument. WUPA includes Paleozoic and Mesozoic sedimentary rocks, which are covered by younger volcanic rocks, eolian, and alluvium deposits; Pliocene and Pleistocene volcanic rocks of the San Francisco Volcanic field (e.g., basalt flows, cinder cones), which form a protective caprock over the softer Triassic strata of the Moenkopi formation; Mesozoic rocks, which include the Moenkopi and Kaibab Formations; and quaternary surficial deposits. The Moenkopi Formation is approximately 20 feet thick in the WUPA area and overlies the Kaibab Formation, which is approximately 235 feet thick (Cave Research Foundation 1976). The monument is best known for the deep red siltstones, which were used to build the monument's ancient ruins.

The WUPA Visitor Center area surface geology is dominated by quaternary surficial deposits from the Holocene (Billingsley et al. 2007), which consists of young alluvial fan deposits with gray-brown silt, sand, pebbles, cobbles, or boulders. The alluvial fan deposits are composed mainly of limestone, chert, and sandstone clasts derived from Permian and Triassic strata of the Coconino Plateau area. The pebbles and cobbles are comprised of basalt and andesite and pyroclastic fragments from the San Francisco volcanic field. The surficial deposits are partly consolidated by gypsum and calcite cement. Overlying the Holocene surficial deposits is a layer of volcanic ash and cinder outfall from the Sunset Crater Volcano, which erupted about 900 years ago. At the project site, the volcanic ash and cinder have been moved over the centuries by wind into a set of dunes immediately below the basalt bluffs of Woodhouse Mesa.

The soil within the project area includes Lomaki-Nalaki very cindery loams, which are approximately 40 inches deep before reaching a duripan, and are alluvium derived from pyroclastic rocks. The soils are well drained and the depth to the water table is more than 80 inches deep (NRCS 2008).

3.6.1.2 Methodology and Intensity Thresholds

The thresholds of change for the intensity and duration of an impact are defined as follows:

Impact Intensities and duration definitions for Geologic Resources and Soils

Negligible	Soils and/or bedrock would not be affected or the effect would be below or at the lower levels of detection. Any effects to soils would be slight and not measurable.
Minor	The effects to soils, bedrock, and erosion disturbance would be detectable, but small and localized. Minimal soil loss would occur.
Moderate	The effects to soils and/or bedrock would be readily apparent and would result in change over a wide area or multiple locations. Erosion would extend beyond the project site and have some soil loss.
Major	The effects to soils and/or bedrock would be readily apparent and would substantially change the character of the soils over a wide area and substantial erosion would occur resulting in large soil loss.
Duration	Short-term - If soils and geologic resources recover in less than 3 years from project impacts. Long-term – If soils and geologic resources recover in more than 3 years from project impacts.

3.6.1.3 Analysis of Alternatives and Impacts on Geologic Resources and Soils

Impacts of Alternative I: No Action Alternative

No immediate impacts to soils and/or bedrock outcrops would be expected under the No Action Alternative. The existing treatment and disposal structures would be repaired and maintained on as need basis. Soils may be disturbed during those repairs and maintenance, but bedrock would not be disturbed. However, the soils surrounding the existing treatment and disposal structures

were disturbed when the wastewater system was initially installed. Soils could potentially become contaminated if the evaporative sewer lagoons become unlevel and overflow or if the blocked pipes leak. Impacts to soils would be direct, minor to moderate, long-term, adverse, and local, and there would be no impacts to bedrock.

Cumulative Effects

Future park development and construction activities would overtime increase the total area of soil and/or bedrock disturbance around the WUPA Visitor Center and newly proposed facilities. Impacts would be localized, but would persist as long as the facilities were in use. The No Action Alternative combined with the past, present, and foreseeable future actions that may result in increased impacts to soils and/or bedrock, would result in minor, long-term, adverse, site-specific cumulative impacts.

Conclusions

The No Action alternative would result in minor, long-term, adverse, and local impacts due to the potential for sewage contamination to soil and geologic resources. Cumulative effects under this alternative would be minor, long-term, adverse, and site-specific.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

Impacts of Alternative II: The Preferred Alternative

The replacement of the existing treatment and disposal methods with a 12,000 gallon septic tank, 3,000 gallon recirculation tank, and one 1,000 gallon discharge septic tank, a fabric filtration system, new gravity pipes installed via trenching, and a new drainfield would disturb approximately 0.49 acres of soil, and possibly underlying bedrock on a more localized basis. However, much of the excavation for the proposed septic tank, recirculation tank, discharge septic tank, and filtration system would occur within disturbed areas from previous trenching for the existing sewer lines. Trenching and excavating in undisturbed areas would be required for the new low pressure sewer main leading from the septic tanks to the drainfield and for the drainfields. Surface deposits would be removed and conserved separately then placed back on top to cover the trenches after the work is completed. In addition, soil erosion control measures would be implemented. Temporary silt fences would be installed around stockpiles and/or excavated material that cannot be backfilled within the same day excavated; downstream of any utility trench that has not been backfilled; and prior to leaving the work site for the day. Replacement of the existing treatment and disposal infrastructure would reduce the potential of contamination to soils in the area. Impacts to soil and geologic resources would be direct, minor, short-term to long-term, adverse, and local.

Cumulative Effects

Future park development and construction activities would overtime increase the total area of soil and/or bedrock disturbance around the WUPA Visitor Center and newly proposed facilities. Impacts would be very localized, but would persist as long as the facilities were in use. The Preferred Alternative would add approximately 0.49 acres more of soil disturbance. The Preferred Alternative combined with the past, present, and foreseeable future actions that may result in increased impacts to soil and geologic resources, would result in direct, minor, short-term to long-term, adverse, and local cumulative impacts.

Conclusions

The Preferred Alternative would result in direct, minor, short-term, adverse, and local impacts to soil and geologic resources. Soils are expected to recover quickly due to topsoil conservation and soil erosion controls. Impacts to shallow bedrock strata would be permanent but very localized. Cumulative effects under this alternative would be minor, short-term to long-term, adverse, and local.

Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

3.6.2 Vegetation

The 2006 Management Policies for the National Park Service (NPS) states the NPS will preserve and maintain all plants native to the naturally evolving park unit ecosystems by preserving and restoring the abundances, diversity, dynamics, habitats, distributions, and natural processes of native plants (NPS). Management practices to limit potential impacts to vegetation vary amongst each NPS units. However, parks generally have management practices to minimize potential impacts to vegetation and to protect sensitive vegetation resources.

3.6.2.1 Affected Environment

The vegetation within WUPA is diverse, including nearly barren beds of cinder or lava and rock outcrops to grassy prairies, open savannas of one-seed juniper (*Juniperus monosperma*) trees, sparsely vegetated badlands, sand dunes, and dense riparian corridors. Most of WUPA is sparsely vegetated, but less than 1% is considered barren (i.e., < 2% vegetation cover). Barren areas within WUPA include cinder barrens, basalt outcrops, and active river channels near the Little Colorado River (Hansen et al. 2004).

The project area is dominated by shrublands, which occurs throughout the monument as sparse shrublands in badland areas and range from moderately dense mixed shrublands to dense riparian and wash shrublands. The project area falls within the sand sagebrush (*Artemisia filifolia*) –

Torrey's Joint-fir (*Ephedra torreyana*), Mormon-tea (*Ephedra viridis*) shrubland association (Hansen et al. 2004). Total vegetation cover of this plant association ranges from 15-30% (Hansen et al. 2004). The shrub layer is not dominated by a single species but rather a group of species that co-dominate. *Artemisia filifolia* (sand sagebrush) is the only consistent shrub to occur within the association. It functions as an indicator species. The other predominant shrubs consists of rubber rabbitbrush (*Erica nauseosa*), broom snakeweed (*Gutierrezia sarothrae*), and fourwing saltbush (*Atriplex canescens*). The herbaceous layer is not dominated by a single species. The most abundant plant species associated within the plant community are:

Indian ricegrass (*Achnatherum hymenoides*), purple threeawn (*Aristida purpurea*), Biegelow sagebrush (*Artemisia bigelovii*), fourwing saltbush (*Atriplex canescens*), tarragon (*Artemisia dracunculus*), shadescale saltbush (*Atriplex confertifolia*), black grama (*Bouteloua eriopoda*), rubber rabbitbrush (*Ericameria nauseous*), crispleaf buckwheat (*Eriogonum corymbosum*), Apache plume (*Fallugia paradoxa*), broom snakeweed (*Gutierrezia sarothrae*), pale desert-thorn (*Lycium pallidum*), bush muhly (*Muhlenbergia porteri*), James' galleta (*Pleuraphis jamesii*), smallflower globemallow (*Sphaeralcea parvifolia*), alkali sacaton (*Sporobolus airoides*), Coulter's wrinkle-fruit (*Tetradlea coulteri*), narrowleaf yucca (*Yucca angustissima*), and prairie zinnia *Zinnia grandiflora*.

3.6.2.2 Methodology and Intensity Thresholds

The thresholds of change for the intensity and duration of an impact are defined as follows:

Impact Intensities and duration definitions for Vegetation Resources

Negligible	No native vegetation would be affected or some individual native plants would be affected, but there would be no effect on native plant species' populations. The effects would be on a small scale.
Minor	Some individual plants would be affected and a relatively limited portion of that species' population would also be affected. Mitigation to offset adverse effects could be required and would be effective.
Moderate	Some individual native plants would be affected and a sizeable segment of the species' population would also be affected over a relatively wide area. Mitigation to offset adverse effects could be extensive, but would likely be successful.
Major	Impacts would be considerable on individual native plants and affect a sizeable segment of the species' populations over a relatively wide area. Mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.
Duration	Short-term – If vegetation resources recover in 3 years or less Long-term – If vegetation resources recover in more than 3 years

3.6.2.3 Analysis of Alternatives and Impacts on Vegetation Resources

Impacts of Alternative I: No Action Alternative

There would be no change to the current treatment and disposal methods under the No Action Alternative. The existing treatment and disposal infrastructure would be repaired and maintained on as need basis and individual plants may be disturbed during those repairs and maintenance.

Occasional impacts to individual plants generally do not affect plant populations, vegetation communities, or ecological processes. The No Action Alternative would result in direct, negligible to minor, adverse, short-term, and site-specific impacts to the vegetation resources.

Cumulative Effects

Future park development and construction activities would impact small, localized areas of vegetation disturbance to individual plants or a limited portion of the species' population. The No Action Alternative combined with the past, present, and foreseeable future actions may result in increased impacts to vegetation resources that are direct, minor, adverse, short-term to long-term, and site-specific.

Conclusions

The No Action Alternative would result in direct, negligible to minor, adverse, short-term, and site-specific impacts due to the potential for damaging individual plants during maintenance activities. Cumulative impacts would be direct, minor, adverse, short-term to long-term, and site-specific due to the localized areas of vegetation disturbance to individual plants or a limited portion of the species' population.

Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

Impacts of Alternative II: The Preferred Alternative

The replacement of the existing treatment and disposal infrastructure would disturb approximately 0.49 acres of the sand sagebrush – Mormon tea shrubland plant association. However, the digging for the new septic tanks and filtration system would mainly occur within areas disturbed from previous trenching for the existing sewer lines, and clearing of vegetation would be limited to a 10 foot wide corridor along the proposed sewer line alignment and to a 20 foot wide perimeter around proposed septic tanks and drainfields. Trenching and excavating in undisturbed areas would be required for the new low pressure sewer main leading from the septic tanks to the drainfield and for the drainfields.

A temporary barrier would be provided to protect existing shrubs and plants and root zones, and a revegetation plan would be implemented for the disturbed areas. Some plants may benefit from additional water and nutrients available over the drainfield. The impacts to individual shrubs combined with the small area to be disturbed should not affect the plant population, vegetation communities, or ecological processes within WUPA. An estimated 2.5 acres of native vegetation would eventually recover over the abandoned lagoon area, an indirect, minor, beneficial, long term, localized impact. The Preferred Alternative would result in direct, negligible to minor, adverse, short-term to long-term and site-specific impacts.

Cumulative Effects

Future park development and construction activities would have small, localized areas of vegetation disturbance and may affect individual plants/shrubs and a relatively limited portion of that species' population. The impacts to individual plants/shrubs and a relatively limited portion of that species' population should not affect the plant population, vegetation communities, or ecological processes within WUPA. The Preferred Alternative in combination with the past, present, and foreseeable future actions that may result in increased impacts to vegetation resources would add less than an acre of vegetation disturbance, and would occur within some previously disturbed areas. Therefore, the Preferred Alternative would add little to the overall impacts on vegetation, which would be direct minor, short-term to long-term, adverse, and site-specific.

Conclusions

The Preferred Alternative impacts to vegetation resources would be direct, negligible to minor, short-term to long-term, adverse, and site-specific due to the small size of disturbance. Cumulative impacts would be direct, minor, short-term to long-term, adverse, and site-specific.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

3.6.3 Wildlife

The 2006 Management Policies for the National Park Service (NPS) states the NPS will preserve and maintain all animals native to the naturally evolving park unit ecosystems by preserving and restoring the abundances, diversity, dynamics, habitats, distributions, and natural processes of native animals. The Migratory Bird Treaty Act (16 USC 703-712) protects bird species that could occur in the proposed project area. Management practices to limit potential impacts to wildlife vary from park to park. However, parks generally have management practices that are designed to minimize potential impacts to wildlife, especially during sensitive periods of the year such as during mating or nesting seasons.

3.6.3.1 Affected Environment

There are approximately 230 vertebrate species recorded for WUPA. Habitats at WUPA are divided into desert scrub vegetation east of the Doney Cliffs, juniper savanna and grassland on the uplands west of the Doney Cliffs, and a limited amount of riparian habitat along the Little Colorado River on the east border of the monument (Drost 2009). Common wildlife species found within WUPA include the following: pronghorn (*Antilocapra americana*), desert cottontail (*Sylvilagus auduboni*), deer mouse (*Peromyscus maniculatus*), brush mouse (*P. boylii*), rock pocket mouse (*Chaetodipus intermedius*) (Drost 2009), collared lizard (*Crotaphytus collaris*),

side-blotched lizard (*Uta stansburiana*), gopher snake (*Pituophis catenifer*), striped whipsnake (*Masticophis taeniatus*), horned lark (*Eremophila alpestris*), and black-throated sparrow (*Amphispiza bilineata*).

The undisturbed portion of the project area currently provides habitat for burrowing rodents, snakes, and lizards, such as deer mice, side-blotched lizards, and gopher snakes. The lagoon area has long been surrounded by a tall, chain-link fence, which prevents access by most wildlife except for birds and bats which can fly over to access the open effluent. Although they are man-made and the water quality is very poor, the existing evaporative sewage lagoons provide a water source for a number of bird and bat species, including some common waterfowl species which are otherwise not typical of the natural habitat surrounding the WUPA visitor center area. Twenty-two bird species were documented at the existing lagoon during the late 1970's, with the only waterfowl species being ducks (unspecified) and Water Pipit (Bateman 1980). Other NPS staff and visitor waterfowl observations include Bufflehead Duck, Great Egret, Snowy Egret, and Killdeer, (Wildlife Observation Cards on file, Natural Resources Division, Flagstaff Area National Monuments). Seven bats species were also documented utilizing the existing lagoon the late 1970's (Bateman 1980), and Drost (2009) documented two additional bat species which are likely to use them. Except for four of the bat species (discussed in the Special Status Species section below) all of the potentially affected wildlife species are relatively common and/or widespread within the region.

3.6.3.2 Methodology and Intensity Thresholds

The thresholds of change for the intensity and duration of an impact are defined as follows:

Impact Intensities and duration definitions for Wildlife

Negligible	No wildlife species would be affected or some individuals could be affected as a result of the alternative, but there would be no effect on wildlife species' populations. Impacts would be well within natural fluctuations.
Minor	Some wildlife species would be affected and a limited part of the species' population would be affected as a result of the alternative. Mitigation measures, if needed, would be simple and successful.
Moderate	Some wildlife species would be affected and a sizeable part of the species' population would be affected as a result of the alternative over a relatively large area within WUPA. Mitigation measures, if needed, would be extensive and successful.
Major	A considerable effect on wildlife individuals and on a sizeable segment of the species' population as a result of the alternative over a relatively large area in and outside WUPA. Extensive mitigation measures would be needed to offset any adverse effects and may not be successful.
Duration	Short-term – If individual species or habitat recovers in ≤ 3 years. Long-term – If individual species or habitat recovers in >3 years.

3.6.3.3 Analysis of Alternatives and Impacts on Wildlife

Impacts of Alternative I: No Action Alternative

There would be no change to the current treatment and disposal methods under the No Action Alternative. The existing treatment and disposal structures would be repaired and maintained on as need basis and individual wildlife species may be disturbed during those repairs and maintenance. Individuals may be temporarily displaced due to the noise from equipment and soil disturbance and human presence during repair and maintenance activities. The affected species are relatively widespread, and occasional impacts to individual animals would generally not affect wildlife populations, wildlife communities, or ecological processes. Birds and bats would continue to utilize the existing lagoons as an artificial source of water. The No Action Alternative would result in negligible, adverse or beneficial, short-term to long-term, and site-specific impacts to wildlife, depending upon the species.

Cumulative Effects

Future park development and construction activities would have small, localized areas of disturbance to wildlife species. The disturbance would consist of noise from construction and vehicle traffic, and soil disturbance. The No Action Alternative combined with the past, present, and foreseeable future actions that may result in increased impacts to wildlife resources would be negligible to minor, adverse, short-term and long-term, and local.

Conclusions

There would be no change to the current conditions for wildlife species under the No Action Alternative. The existing treatment and disposal method for the wastewater system would be repaired and maintained on as need basis, which may create some disturbance to relatively abundant and/or widespread wildlife species (i.e., equipment noise, ground disturbances human presence) during repairs. The No Action Alternative would result in negligible, adverse or beneficial, short-term and long-term, and site-specific impacts to local wildlife populations and their habitats, depending upon which species.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

Impacts of Alternative II: The Preferred Alternative

The proposed treatment and disposal method replacement construction would temporarily disturb burrowing rodents, amphibians, and reptiles within the project area. During trenching activities, wildlife in the area would experience an increase in noise disturbance from construction equipment, human presence, and soil disturbance. In addition, reproduction and survival for individuals may be affected due to increased stress and loss of foraging opportunities. Habitat loss may occur for some individuals due to the placement of permanent structures (i.e., septic tanks, filtration system, drainfield) within the project area. Mortality to small mammals, lizards, and snakes may also occur from the construction activities. However, these species are relatively

common and/or widespread, and occasional impacts to individual animals generally do not affect wildlife populations, wildlife communities, or ecological processes. After the lagoons are demolished, birds and bats would no longer be able to utilize them as a water source or artificial water habitat. After the lagoons are demolished, an estimated 2.5 acres of natural upland habitat would eventually recover over the current sewer lagoon area. The Preferred Alternative would have negligible, short-term and long-term, adverse or beneficial, site-specific impacts to wildlife species, or their habitats, depending upon which species.

Cumulative Effects

Future park development and construction activities would have small, localized areas of noise and habitat disturbance to wildlife species and their habitat. The overall infrastructure footprint and wildlife habitat disturbance within WUPA would be slightly greater under the Preferred Alternative. The Preferred Alternative in combination with the past, present, and foreseeable future actions may result in increased impacts to wildlife resources that are negligible, short-term and long-term, adverse, and site-specific.

Conclusions

The Preferred Alternative would not impact the parks ability to maintain the desired condition for populations of native plant and animal species functioning in as natural condition as possible to WUPA. The Preferred Alternative impacts to wildlife would be negligible, short-term and long-term, and site-specific. Impacts would be either adverse or beneficial, depending upon which wildlife species, because of the combined habitat disturbance for the new system along with the demolition of the existing lagoons and their eventual recovery as natural wildlife habitat. Cumulative impacts would be negligible, short-term and long-term, adverse, and site-specific. The overall wildlife habitat disturbance within WUPA would be slightly greater under the Preferred Alternative.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

3.6.4 Special Status Species

Section 7 of the Endangered Species Act of 1973 requires all federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of federally listed species or designated critical habitats. In addition, the 2006 Management Policies and Director's Order 77 *Natural Resources Management Guidelines* require the NPS to examine the impacts on federal candidate species, as well as state-listed endangered, threatened, candidate, rare, declining, and sensitive species (NPS 2006).

According Section 4.4.2.3 in NPS 2006 Management Policies, the NPS will survey for, protect, and strive to recover all species native to National Park System units that are listed under the ESA. NPS-77 addresses the management of federally listed threatened, endangered, and candidate species, state listed species of concern, and state species of concern identified by other groups such as locally designated species or those established by organizations such as The Nature Conservancy (TNC).

3.6.4.1 Affected Environment

The USFWS was consulted on January 11, 2010 for a list of threatened, endangered, species of concern, or designated critical habitat for the proposed action. The USFWS have no concerns regarding impacts to wildlife or habitat from the proposed action. In addition, the Arizona Heritage Database (Arizona Game and Fish Department 2009) was consulted via the Internet to generate a list of threatened and endangered species, and other species of concern for Coconino County, Arizona. This list was compared with the NPS Inventory and Monitoring Program vertebrate species and vascular plant species occurrence database for WUPA (NPS 2009), which is the most accurate and current documentation of the monument's flora and fauna. A survey for special status plants at the Flagstaff Area National Monuments, including WUPA, was completed in 2000 (Huisinga et al. 2000).

Currently, no federally listed threatened, endangered, candidate, plant or animal species is known to occur within WUPA, and the monument does not include viable habitat for any listed species (see letter from USFWS in Appendix A).

Five species of concern, including the Wupatki pocket mouse (*Perognathus amplus cineris*), Townsend's big-eared bat (*Corynorhinus townsendii* spp. *pallescens*), spotted bat (*Euderma maculatum*), Western small-footed myotis (*Myotis ciliolabrum*), and fringed myotis (*Myotis thysanodes*) are known to occur within or near the proposed project area. The Wupatki pocket mouse is a subspecies of the Arizona pocket mouse and is only found in northern Arizona from Wupatki National Monument north to the Echo Cliffs near Marble Canyon (Hoffmeister 1986). WUPA is the only land management area that provides long-term protection for the Wupatki pocket mouse's desert scrub habitat (Drost 2009). This species is most active at night, and inhabits various types of desert scrub habitat. Little is known about the distribution or status of the subspecies, but Drost (2009) reported them as relatively abundant in saltbush desert scrub vegetation within the Wupatki Basin surrounding the project area.

In addition to the Wupatki pocket mouse, the Townsend's big-eared bat (*Corynorhinus townsendii* spp. *pallescens*), spotted bat (*Euderma maculatum*), Western small-footed myotis (*Myotis ciliolabrum*), and fringed myotis (*Myotis thysanodes*) may be affected by the Preferred Alternative. Very little is understood about the distribution, abundance, or habitat use of bats at WUPA, but based upon the survey results reported in Bateman (1980) and Drost (2009) these four bat species either known or potentially utilize the existing sewage lagoons for insect foraging and as a source of water, and all of them except for the spotted bat are relatively abundant and widespread within the Wupatki area.

3.6.4.2 Methodology and Intensity Thresholds

The thresholds of change for the intensity and duration of an impact are defined as follows:

Impact Intensities and duration definitions for Special Status Species

Negligible	No individuals of a special-status species would be affected but a very localized area of their habitats could be affected as a result of the alternative.
Minor	A few individuals of special status species or localized areas of their respective habitats would be affected, but the species' population would not be affected as a result of the alternative. Mitigation measures, if needed, would be simple and successful.
Moderate	A number of individuals of special status species populations or a limited portion of their respective habitats would be affected as a result of the alternative. The impacts would be difficult to detect using typical population monitoring techniques. Mitigation measures, if needed, would be extensive and successful.
Major	A measureable portion of a special-status population or their large portion of their respective habitats would be affected as a result of the alternative over a relatively large area within WUPA. The impacts would be readily detectable using typical population monitoring techniques. Extensive mitigation measures would be needed to offset any adverse effects and may not be successful.
Duration	Short-term – If individual species or habitat recovers in ≤ 1 year; population recovers in ≤ 5 years. Long-term – If individual species or habitat recovers in ≥ 1 year; population recovers in >5 years.

3.6.4.3 Analysis of Alternatives and Impacts on Special Status Species

Impacts of Alternative I: No Action Alternative

Under the No Action Alternative, the existing treatment and disposal structures would be repaired and maintained on as need basis. Wupatki pocket mouse individuals may be disturbed infrequently during those repairs and maintenance. Individuals may be temporarily displaced due to the noise from equipment and soil disturbance and human presence during repair and maintenance activities. The No Action Alternative would result in negligible, adverse, short-term and long-term, and site-specific impacts to Wupatki pocket mouse individuals, populations, or habitat. Bats would continue to utilize the existing lagoons as artificial habitat for insect foraging and as a source of water. Bats are mostly nocturnal and would not be active during routine maintenance and repairs to the existing infrastructure. The No Action Alternative would result in negligible to minor, beneficial, short-term and long-term impacts to Townsend's big-eared bat, spotted bat, Western small-footed myotis bat, and fringed myotis bat populations and their habitats.

Cumulative Effects

Future park development and construction activities would have small, localized areas of disturbance to special status species. The Disturbance would consist of noise from construction and vehicle traffic, and soil disturbance. The No Action Alternative combined with the past,

present, and foreseeable future actions that may result in increased impacts to special status species would be negligible to minor, adverse, short-term and long-term, and local.

Conclusions

There would be no change to the current conditions for the Wupatki pocket mouse, Townsend's big-eared bat, spotted bat, Western small-footed myotis bat, and fringed myotis bat under the No Action Alternative. The No Action Alternative would result in negligible, adverse, short-term and long-term impacts to the Wupatki pocket mouse, and negligible to minor, beneficial, short-term and long-term, and localized impacts to sensitive bat species populations.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

Impacts of Alternative II: The Preferred Alternative

The project area includes suitable saltbush desert scrub habitat, and construction of the new disposal system is likely to affect a few individuals of Wupatki pocket mouse. The construction activities would cause disturbance from noise (i.e., equipment, human presence) and digging and may result in mortality for a few individuals. However, the species is likely prolific as similar rodent species are, and the loss of a few individuals from construction activities likely has no long-term adverse consequence for the population. After the lagoons are demolished, an estimated 2.5 acres of desert scrub habitat for the Wupatki pocket mouse would eventually recover over the area, a potential net habitat gain of approximately 2 acres. Replacing the treatment and disposal methods under the Preferred Alternative would have minor, short-term, adverse impacts, and minor, long-term, beneficial impacts to Wupatki pocket mouse individuals, populations, or habitat.

Bats would no longer be able to utilize the lagoons as a water source or artificial habitat after they are demolished. All four bat species that are known to utilize or to potentially utilize the existing lagoons are likely to have large enough ranges that they would be less dependent upon a single source of water for all of their water needs. It is possible some individuals would be displaced from using the existing lagoon area, resulting in minor, long-term, adverse impacts to Townsend's big-eared bat, spotted bat, Western small-footed myotis bat, and fringed myotis bat populations.

Cumulative Effects

Future park development and construction activities would have small, localized areas of noise and soil disturbance, and potential habitat loss for special status species. The Final Environmental Impact Statement and General Management Plan (2002) concluded the impacts to the Wupatki pocket mouse from new actions of the Preferred Alternative would be minor to

moderate, long-term, and adverse due to increased visitors and the new visitor orientation facility would permanently impact a local area of habitat. The Preferred Alternative in combination with the past, present, and foreseeable future actions that may result in increased impacts to special status species would result in negligible to minor, short-term and long-term, adverse, and site-specific impacts. The Preferred Alternative would only temporarily add to this impact.

Conclusions

The Preferred Alternative would not impact the NPS ability to maintain the desired condition for conserving naturally-functioning populations of special status species at WUPA. The Preferred Alternative impacts to special status species would be minor, short-term and long-term, adverse, and site-specific. Cumulative impacts would be slightly greater than under the No Action Alternative, but would remain negligible to minor, short-term and long-term, adverse, and site-specific.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

3.6.5 Water Resources

The Colorado Plateau is a very arid region, where perennial surface waters and associated aquatic, wetland, and riparian habitats are crucial to sustaining native biological diversity. Many of the rarest plants and animals are restricted to streams and other wetland habitats. In addition, freshwater aquifers are crucial sources of private and public water supplies within the southwestern United States, and often provide crucial inflows to streams and springs. Under the 2006 Management Policies, the NPS will perpetuate surface and ground water as integral components of park ecosystems and avoid, whenever possible, the pollution of park waters by human activities occurring within and outside of parks. The NPS is required to protect surface water quality under the Clean Water Act, and to prevent contamination of current or future underground sources of drinking water under the Safe Drinking Water Act. Within Arizona, the authority for reviewing and issuing permits for discharging wastewater has been delegated by the U.S. Environmental Protection Agency to the Arizona Department of Environmental Quality.

3.6.5.1 Affected Environment

WUPA is largely included within the upland watershed that drains the east and northeast San Francisco Mountain slopes toward the Little Colorado River (NPS 2002). Within the regional watershed, surface waters are extremely scarce. The upland surface bedrock is dominated by a highly porous sequence of volcanic deposits overlying the Kaibab Limestone, which allows most precipitation to rapidly infiltrate into the ground instead of flowing across the surface (Cosner 1965, Christensen 1982, Billingsley 2007). Reliable groundwater is found within the Coconino Aquifer, at a depth of 800 feet beneath the project area (Christensen 1982). A unique

subterranean system of deep fissures within the WUPA region provides local conduits for rapid recharge to this aquifer (Thomas et al. 2006). The NPS operates a well drilled into the aquifer to supply water to the WUPA Visitor Center and operations area.

Within WUPA, surface water occurs ephemeral as snowpack and in small water catchment “potholes” in bedrock outcrops and dry washes. Ephemeral stormwater flows also occur with greater reliability in the larger drainages, including Deadman Wash, Antelope Wash, Citadel Wash, and the Little Colorado River. In the historic record, perennial surface water was limited to three springs – Wupatki Spring, Heiser Spring, and Peshlaki Spring - all located along the base of Woodhouse Mesa within 1.5 miles of the project site. The three springs are all sited along east-southeast facing hill slopes, and are fed by the same shallow, perched aquifer just below a thick sandstone bed in the Moenkopi Formation (Cosner 1962, Christensen 1982). The perched aquifer is locally recharged by precipitation, primarily snowfall, onto Woodhouse Mesa to the south and west of the WUPA Visitor Center area. There is evidence of subsurface water flow at one other location between Heiser Spring and the visitor center area (Cinnamon 1984). In addition, surface gypsum and carbonate evaporite deposits on rock outcrops at other locations are either formed by stormwater evaporation or are evidence of greater groundwater movement within the area during wetter periods over the last 12,000 years (Paul Whitefield, personal communication).

All three springs have been heavily utilized and modified since the 1880’s to support historic sheepherding, ranching, and NPS operations. Wupatki Spring is about 0.5 mile west and the nearest to the project site. Early in the history of the monument, Wupatki Spring was diverted as the primary water supply to the Visitor Center an operations area. Flow at the spring steadily declined through the 1950’s drought, ceasing altogether in 1959, likely as a result of NPS efforts to stimulate flow by fracturing the sandstone and mudstone beds in the perched aquifer. The Heiser Spring area was homesteaded during the early 20th century, later the site of a Civilian Conservation Corps labor camp during the Depression, and by the 1950’s also diverted to support NPS operations. NPS operations around Heiser Spring have been phased out over the last two decades. Under the current GMP, the NPS has demolished the remaining structures and is restoring the area to more natural conditions. Peshlaki Spring was used by local Navajo residents to water their sheep until the 1990’s.

Reliable water flow information for the springs is limited. Between 1950 and 1954 (Costner 1962, Christensen 1987), annual discharge from Heiser spring ranged from 1.7 to 4.3 acre-feet per year, with a maximum daily flow record of 5,700 gallons per day. Flow at the spring fluctuated considerably from year to year. Flow at all three springs appears to have gradually declined over the entire period of record. The region has remained in a long-term drought since 1996, and water table levels at both Peshlaki and Heiser springs are believed to be at historic record lows. Thomas (2003) reported Heiser Spring to have calcium sodium sulfate water. Water quality at the spring is notably good, with Secondary Contaminant Levels exceeded for sulfate and dissolved solids.

The surface geology around the project site is comprised of unconsolidated volcanic cinder, from the Sunset volcanic eruption, over older, unconsolidated alluvial deposits of Pleistocene-Holocene age around the base of Woodhouse Mesa. Based on the drilling log for the nearby

Wupatki Ruin Well, the unconsolidated deposits are about 10 feet thick in the project area. Beneath these two units lies about 50 to 95 feet of the Moenkopi Formation (Lower Triassic), which is comprised of thinly bedded siltstone and sandstone layers and is notable for its impermeability to water (Christensen 1982). Beneath the Moenkopi are the Kaibab Limestone (Permian) and Coconino Sandstone (Permian).

The proposed wastewater disposal system would not be located in the vicinity of any regulated surface waters. Because precipitation is very low, stormwater runoff around the project site is rare, except for a few scattered summer thunderstorms in a typical year. The nearest dry wash is an unnamed tributary of Deadman Wash, which is about 0.75 miles down-drainage. The WUPA Visitor Center and existing evaporative lagoons are located within the upper reach of the unnamed tributary, as would be the proposed wastewater replacement system.

3.6.5.2 Methodology and Intensity Thresholds

The thresholds of change for the intensity and duration of an impact are defined as follows:

Impact Intensities and duration definitions for Water Resources

Negligible	There would be no detectable change in the quality of natural surface water or water aquifers. There would be no risk of accidental discharge of wastewater into the surface environment.
Minor	There would be a detectable change in the quality of natural surface water or water aquifers at the immediate discharge point. The quality of affected waters would remain within permit standards under the Clean Water Act and/or Safe Drinking Water Act. For adverse impacts, any accidental wastewater discharge into the environment would remain small in volume, and be readily detected, controlled, and cleaned up. Any accidental pollutant release could be corrected by standard repairs and maintenance of the existing treatment/discharge system.
Moderate	There would be an observable or measurable change in the quality of natural surface water or water aquifer. For adverse impacts, the quality of affected waters might infrequently violate permit standards under the Clean Water Act and/or Safe Drinking Water Act. Any accidental wastewater discharge into the environment could cause limited environmental contamination and/or require substantial effort to contain, control, and clean up. Any accidental pollutant release could be addressed by upgrading or otherwise improving the existing wastewater treatment/discharge system.
Major	There would be extensive and substantial change in the quality of natural surface water or water aquifer. For adverse impacts, the quality of affected waters might chronically violate and/or impair natural surface water or groundwater under the Clean Water Act and/or Safe Drinking Water Act. There would be an unacceptable risk of a large accidental discharge into the surface environment which would cause widespread environmental contamination or otherwise be extremely difficult to contain, control, and clean up. The violations could only be addressed by entirely replacing the existing wastewater treatment/discharge system.

Duration	Short-term - If water quality recovers in one day or less. Long-term – If water quality recovers in more than one day.
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3.6.5.3 Analysis of Alternatives and Impacts on Water Resources

Impacts of Alternative I: No Action Alternative

There would be no changes to the existing wastewater system under the No Action Alternative. There would be no potential for contamination of the local perched aquifer that feeds the nearby springs, or the deep regional Coconino Aquifer. The evaporative sewer lagoons would remain too small to handle the current effluent volume, and the NPS would continue to manually pump to maintain the effluent levels and the pipes would continue to be at risk of blockage. The pipes would not be replaced until a leak was detected. Although, no contamination from the existing wastewater system has occurred, continued blocked pipes and potential overflow from the evaporative sewer lagoons would potentially contaminate the upper drainage channel of the nearby tributary to Deadman Wash. There is some probability this would occur during a period of stormwater runoff, as intense storm events also can rapidly raise the level of effluent within the lagoons. The current wastewater system has violated Arizona Department of Environmental Quality regulations over the years, and there is some risk of a discharge of sufficient volume to pose a risk of local environmental contamination, but such a spill would be detected and responded to before it became extensive. The continued risk of future sewage leaks and overflows would result in indirect, minor, short-term to long-term (depending on how quickly a leak was detected), adverse, and local impacts.

Cumulative Effects

Future park development and construction activities could impact water resources by creating new facilities and potential sources of pollutants in stormwater runoff, but these impacts would be negligible because proper design and mitigation would be required by NPS prior to construction. There would be no potential for contamination of the local perched aquifer that feeds the nearby springs, or the deep regional Coconino Aquifer. The No Action Alternative combined with the past, present, and foreseeable future actions that may result in increased impacts to water resources would result in negligible to minor, long-term, adverse, local cumulative impacts due to the potential for pollutant discharges into the ephemeral drainage system.

Conclusions

There would be no potential for contamination of the local perched aquifer that feeds the nearby springs, or the deep regional Coconino Aquifer. The No Action alternative would result in negligible to minor, short-term to long-term, adverse, and local impacts to ephemeral surface waters due to the potential for sewage leaks and how rapidly they would be controlled. Cumulative effects under this alternative would be negligible to minor, long-term, adverse, and local due to the potential increase of pollutants in stormwater runoff.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

Impacts of Alternative II: The Preferred Alternative

The replacement of the existing evaporative lagoon system with a new drainfield system would reduce the potential for future sewage overflows and risk of environmental contamination within the nearby tributary drainage of Deadman Wash. No direct adverse impacts to stormwater runoff quality are anticipated by construction activities, because best management practices, such as proper hazardous materials storage and appropriate silt fencing around excavations, would be implemented to prevent any accidental spill or sediment transport into the nearby ephemeral drainage system.

Under the Preferred Alternative, the drainfield would be buried in surface deposits of recent volcanic cinder from the Sunset volcanic eruption, and an older unconsolidated alluvial fan of Pleistocene-Holocene age that formed around the toe of Woodhouse Mesa. Based on the drilling log for the nearby Wupatki Ruin Well, the unconsolidated deposits are about 10 feet thick in the project area. Beneath these two units lies the thin bedded siltstone and sandstone Moenkopi Formation (Lower Triassic), including the sandstone unit from which the springs are fed. The dip of the Moenkopi strata is downslope to the northeast and away from all three spring sites, so that drainfield effluent would not mix with water discharging at the springs. The system is engineered so that all effluent would percolate into the underlying bedrock without a risk of eventually discharging back to the surface. The regional Coconino Aquifer is of sufficient depth that effluent would be broken down by natural bacterial activity before mixing with groundwater, as occurs with any approved septic system. The system would be evaluated during the ADEQ permitting process to ensure there is no risk of contamination with surface or groundwater resources. The Preferred Alternative would result in direct, minor, long-term, beneficial, and local impacts due to the reduced potential for sewage effluent pollutant discharges into the ephemeral drainage system.

Cumulative Effects

Future park development and construction activities could impact water resources by creating new facilities and potential sources of pollutants in stormwater runoff, but these impacts would be negligible because proper design and mitigation would be required by NPS prior to construction. There would be no potential for contamination of the local perched aquifer that feeds the nearby springs, or the deep regional Coconino Aquifer. The No Action Alternative combined with the past, present, and foreseeable future actions that may result in increased impacts to water resources would result in negligible to minor, long-term, adverse, local cumulative impacts due to the potential for pollutant discharges into the ephemeral drainage system.

Conclusions

The Preferred Alternative would result in direct, minor, long-term, beneficial, and local impacts to surface water resources due to improvements to the existing inadequate treatment and disposal methods. There would be no potential for contamination of the local perched aquifer or the regional aquifer, resulting in negligible, long-term, local impacts to groundwater quality. Cumulative effects under this alternative would be negligible to minor, long-term, adverse, and local.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

3.7 Cultural Resources

3.7.1 Archeological Resources

Section 106 of the National Historic Preservation Act, as amended in 1992 (16 USC 470 *et. seq.*); the NPS's Director's Order 28 *Cultural Resource Management Guideline*; and NPS 2006 *Management Policies* (NPS 2006) require the consideration of impacts on historic properties that are listed, or eligible to be listed, in the National Register of Historic Places. The National Register is the nation's inventory of historic places and the national repository of documentation on property types and their significance. The above-mentioned policies and regulations require federal agencies to coordinate consultation with State Historic Preservation Officer regarding the potential effects to properties listed on or eligible for the National Register of Historic Places.

The NPS, as steward of many of America's most important cultural resources, is charged to preserve historic properties for the enjoyment of present and future generations. Management decisions and activities throughout the National Park System must reflect awareness of the irreplaceable nature of these resources. The NPS 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 2006 Management Policies and the appropriate Director's Orders. The replacement of the wastewater system would require digging with the potential to disturb archeological resources.

3.7.1.1 Affected Environment

A complete inventory of archeological resources within WUPA was completed in the mid-1980s, revealing a total of 2,668 archeological sites (Anderson 1990). This total did not include Wupatki, Wukoki, Citadel, and Nalakihu, which would bring the total number of documented sites to 2,672. Out of the 2,668 sites, 2,405 are prehistoric or have prehistoric components and 2,214 sites date between A.D. 1130 and 1160, and 369 sites date between A.D. 1160 and 1220.

There are twice as many sites with ceramic assemblages spanning more than one period that are not included in these minimum numbers. Of the 2,668 sites recorded during the Wupatki Survey, 2,397 exhibit artifacts, petroglyphs, and/or architecture indicative of prehistoric use and of these, 977 are datable on the basis of associated ceramics. Of the 977 dated sites, 949 or 97% date between A.D. 1065± and 1220±.

The vast majority of recorded sites in WUPA are small unit pueblos or pithouse villages with fewer than six rooms. Of the recorded prehistoric sites, 1,080 have one room or one pithouse and 723 have two to six rooms or pithouses. The larger sites such as Wupatki Pueblo (100+ rooms) and the Citadel (50+ rooms) stand out as unusual structures.

There have been no sites recorded within the proposed project area. Three sites are located approximately 665 feet and 485 feet northwest, and 400 feet northeast of the proposed project area, respectively.

3.7.1.2 Methodology and Intensity Thresholds

The thresholds of change for the intensity and duration of an impact are defined as follows:

Impact Intensities and duration definitions for Cultural Resources

Negligible	Impact is at the lowest levels of detection, barely measurable, with no perceptible consequences, either adverse or beneficial. For the purposes of Section 106, the determination of effect would be no adverse effect to archaeological resources.
Minor	Disturbance of a site(s) is confined to a small area with little, if any, loss of important information potential. For purposes of Section 106, the determination of effect would be no adverse effect.
Moderate	Disturbance of the site(s) would not result in the loss of integrity. For purposes of Section 106, the determination of effect would be adverse effect.
Major	Disturbance of the site(s) is substantial and results in the loss of most or all of the site and its integrity. For purposes of Section 106, the determination of effect would be adverse effect.
Duration	Short-term – Any disturbance to archaeological resources would be permanent, and are considered long-term. Long-term – Any disturbance to archaeological resources would be permanent, and are considered long-term.

3.7.1.3 Analysis of Alternatives and Impacts on Archeological Resources

Impacts of Alternative I: No Action Alternative

There would be no change to the current treatment and disposal structures under the No Action Alternative. The existing treatment and disposal structures would be repaired and maintained on an as need basis and soils may be disturbed during those repairs and maintenance. Potential disturbance to the previously recorded archaeological site located approximately 400 feet northeast of the existing evaporative lagoons appears slight based on current information and no known overflow problems of the current wastewater system. In addition, the soils surrounding the existing wastewater system and lagoons were disturbed when the wastewater system was initially installed. The No Action Alternative would result in direct, minor, adverse, long-term, and site-specific impacts.

Cumulative Effects

Future park development and construction activities would have small, localized areas of soil disturbance and would be preceded by archeological monitoring during ground disturbing activities. The Final Environmental Impact Statement and General Management Plan (2002) concluded the impacts to archeological resources from new actions of the Preferred Alternative would be moderate, long-term, and beneficial due to visitors would be restricted to stabilized front country sites and sites in the Lomaki-Citadel vicinity. The No Action Alternative combined with the past, present, and foreseeable future actions that may result in increased impacts to archeological resources would be direct, minor, adverse, long-term, and site-specific.

Conclusions

The No Action Alternative would have direct, minor, adverse, long-term, and site-specific impacts due to the potential for damaging unidentified archeological resources during maintenance activities. Cumulative impacts would be the same as the No Action Alternative impacts.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

Impacts of Alternative II: The Preferred Alternative

The replacement of the existing evaporative sewer lagoons with a 12,000 gallon septic tank, 3,000 gallon recirculation tank, one 1,000 gallon discharge septic tank, a fabric filtration system, new gravity pipes installed via trenching, and a new drainfield would disturb approximately 0.49 acres of soil. Digging would mainly occur within disturbed areas from previous trenching for the existing sewer lines, and soil disturbance, including clearing of vegetation, would be limited to a

10 foot width corridor along the proposed sewer line alignment and to a 20 foot wide perimeter around proposed septic tanks and drainfields. Trenching and excavating in undisturbed areas would be required for the new low pressure sewer main leading from the septic tanks to the drainfield and for the drainfields. However, there are no previously recorded archeological sites within the undisturbed areas for the new low pressure sewer main leading from the septic tanks to the drainfield and the drainfield area. Consequently, archeological resources are not expected to be encountered during digging for this project. However, an archeologist would monitor initial ground-disturbing activities. A decision to continue spot monitoring would be made based upon examination of the soils. Should artifacts be identified during construction, all work would cease in the immediate vicinity of the discovery until the resources could be identified and documented and an appropriate mitigation strategy developed in consultation with the State Historic Preservation Officer. Based upon current information, the Preferred Alternative impacts would be direct, minor, long-term, adverse, and site-specific.

Cumulative Effects

Future park development and construction activities would have small, localized areas of soil disturbance and would be preceded by archeological monitoring during ground disturbing activities. The Final Environmental Impact Statement and General Management Plan (2002) concluded the impacts to archeological resources from new actions of the Preferred Alternative would be moderate, long-term, and beneficial due to visitors would be restricted to stabilized front country sites and sites in the Lomaki-Citadel vicinity. The Preferred Alternative in combination with the past, present, and foreseeable future actions that may result in increased impacts to archeological resources would result in direct, minor, long-term, adverse, and site-specific impacts.

Conclusions

The Preferred Alternative impacts to archeological resources would be direct, minor, long-term, adverse, and site-specific. The cumulative impacts would be the same for the Preferred Alternative.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

3.8 Social Issues

3.8.1 Visitor Use

NPS 2006 Management Policies states the fundamental purpose of all parks is for the enjoyment of park resources and values by the people of the United States. NPS is committed to providing

appropriate, high-quality opportunities for visitors to enjoy the parks, and will provide opportunities specifically suited for the natural and cultural resources found within the park.

3.8.1.1 Affected Environment

Wupatki National Monument Visitor Center is located approximately 14 miles southeast of the park entrance off U.S. Highway 89. The WUPA visitor center is open year round, except on December 25th, and provides information about the monument, educational exhibits, and ranger talks and guided hikes. The existing wastewater system supports the visitor center facilities, residential housing, and the maintenance annex. Annual visitation in 2008 to WUPA was approximately 245,700, and water usage was 869,400 gallons. The increased annual visitation to the visitor's center combined with the residential and employee use far exceeds the design capacity of the existing evaporative lagoons.

3.8.1.2 Methodology and Intensity Thresholds

The thresholds of change for the intensity and duration of an impact are defined as follows:

Impact Intensities and duration definitions for Visitor Use

Negligible	Any changes in visitor use 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. Any effects would not change the visitor's experience of park resources and values.
Minor	Changes in visitor use or experience would be detectable, although the changes would be slight and likely short-term. The visitor would be aware of effects associated with the alternative, but the effects would be slight. If mitigation was needed to offset adverse effects to visitor experience, it would be relatively simple to implement and would likely be successful.
Moderate	Changes in visitor use or experience would be 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. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.
Major	Changes in visitor use or experience would be readily apparent and would have important 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. Mitigation measures to offset adverse effects would be needed, they would have to be extensive, and their success would not be guaranteed.
Duration	Short-term - If visitor use impacts recover in less than 1 year from project impacts. Long-term – If visitor use impacts recover in more than 1 year from project impacts.

3.8.1.3 Analysis of Alternatives and Impacts on Visitor Use

Impacts of Alternative I: No Action Alternative

There would be no change to the current wastewater system under the No Action Alternative. Annual visitation and residential and employee wastewater use would continue to exceed the designed capacity of the existing evaporative lagoons. The evaporative sewer lagoons would continue to be manually pumped to achieve effluent leveling and the pipes would continue to get blocked, which could result in the closure of the visitor center and temporary evacuation of residential housing due to violations to the ADEQ and U.S. Public Health and Safety standards. Impacts to visitor use would be indirect, minor, long-term, adverse, and local.

Cumulative Effects

Future park development and construction activities have the potential to increase wastewater flow, and the existing evaporative sewer lagoons are inadequate to handle potential wastewater increases. The No Action Alternative combined with the past, present, and foreseeable future actions that may result in increased impacts to visitor use would result in minor to moderate, short-term, adverse, local cumulative impacts to visitor use.

Conclusions

The No Action alternative would result in minor, short-term, adverse, and local impacts due to the potential for continued manual pumping to achieve effluent leveling, which could result in the closure of the visitor center. Cumulative effects under this alternative would be minor to moderate, short-term, adverse, and local.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

Impacts of Alternative II: The Preferred Alternative

The replacement of the existing evaporative sewer lagoons with a 12,000 gallon septic tank, 3,000 gallon recirculation tank, one 1,000 gallon discharge septic tank, a fabric filtration system, new gravity pipes installed via trenching, and a new drainfield would benefit visitor use. The replacement of the evaporative sewer lagoons would be able to accommodate the current and future wastewater use for visitors, residents, and employees, and would enhance visitor experience by restoring the landscape to more natural conditions. The proposed project would not require the current wastewater system to be shut down while installing the new treatment and disposal structures. WUPA visitor center would not have to be closed and visitors would not be excluded from areas within the WUPA Monument during construction of the new treatment and disposal structures. However, potential impacts to visitor use experience would include visual quality,

noise, and disturbance encounter levels within the visitor center area. The operation of mechanized equipment would be restricted to normal park operation hours, Monday – Friday. Information regarding the project implementation would be shared with the public through an informational flyer displayed at the visitor center or posting on WUPA’s website. The purpose would be to minimize the potential for negative impacts to visitor use experience during project implementation. Impacts to visitor use by the Preferred Alternative would be direct, minor, short-term, beneficial, and local.

Cumulative Effects

Future park development and construction activities may increase wastewater flow, but the new treatment and disposal structures would be able to handle these potential increases. The Preferred Alternative would be beneficial to visitor use by being able to accommodate the current and future wastewater use for visitors, residents, and employees and all visitor facilities would remain open and operational. The Preferred Alternative combined with the past, present, and foreseeable future actions that may result in increased impacts to visitor use, would result in direct, minor, short-term, beneficial, and local cumulative impacts.

Conclusions

The Preferred Alternative would result in direct, minor, short-term, beneficial, and local impacts. Cumulative effects under this alternative would be minor, short-term, beneficial, and local impacts.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument’s general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument’s resources or values.

3.8.2 Visual Resources

NPS 2006 Management Policies states that scenic views and visual resources are considered highly valued associated characteristics that the NPS should strive to protect (NPS 2006).

3.8.2.1 Affected Environment

Wupatki National Monument Visitor Center is located approximately 14 miles southeast of the park entrance off U.S. Highway 89. The WUPA visitor center is open year round, except on December 25th, and provides information about the monument, educational exhibits, and ranger talks and guided hikes. The current evaporative sewer lagoons are located in the viewshed of the monument and the primary view from the WUPA visitor center.

3.8.2.2 Methodology and Intensity Thresholds

The thresholds of change for the intensity and duration of an impact are defined as follows:

Impact Intensities and duration definitions for Visual Resources

Negligible	A change in visual resources that is not perceptible or measurable.
Minor	Changes in visual resources would be detectable, although the changes would be slight and likely short-term.
Moderate	Changes in visual resources that is readily apparent with measurable consequences.
Major	A severely adverse or exceptionally beneficial change in visual resources that would have long-term consequences.
Duration	Short-term - If visual resource impacts recover in less than 1 year from project impacts. Long-term – If visual resource impacts recover in more than 1 year from project impacts.

3.8.2.3 Analysis of Alternatives and Impacts on Visual Resources

Impacts of Alternative I: No Action Alternative

There would be no change to the current wastewater system under the No Action Alternative. The evaporative sewer lagoons would remain in the viewshed of the monument and the primary view from the WUPA Visitor Center. In addition, the evaporative sewer lagoons remaining within the viewshed could detract from the visitor experience. Impacts to visual resources would be indirect, moderate, long-term, adverse, and local.

Cumulative Effects

Future park development and construction activities would have small, localized areas of disturbance that may be within the view of visitors. However, the disturbance to visual resources would be short-term and the new development and construction would not be within the viewshed of the monument, and would be designed to blend with surrounding landscape. The No Action Alternative combined with the past, present, and foreseeable future actions that may result in increased impacts to visual resources would result in minor, short-term to long-term, adverse, local cumulative impacts to visual resources.

Conclusions

The No Action alternative would result in moderate, long-term, adverse, and local impacts due to the evaporative sewer lagoons remaining within the viewshed of the monument and the primary view from WUPA Visitor Center. Cumulative effects under this alternative would be minor, short-term to long-term, adverse, and local.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

Impacts of Alternative II: The Preferred Alternative

The replacement of the existing evaporative sewer lagoons with a 12,000 gallon septic tank, 3,000 gallon recirculation tank, one 1,000 gallon discharge septic tank, a fabric filtration system, new gravity pipes installed via trenching, and a new drainfield would benefit visual resources. The replacement of the evaporative sewer lagoons would be a beneficial improvement by restoring the landscape and viewshed to natural conditions, which would also enhance the visitor experience. The new treatment and disposal structures would be installed underground and would not impact visual resources. However, potential impacts to visual resources during installation would include construction activity and equipment, vegetation removal, dust, and reclamation efforts within the visitor center area. There would be a revegetation plan implemented for the disturbed area and as the seeded vegetation became established the visual impacts would become less obvious in the landscape. The operation of mechanized equipment would be restricted to normal park operation hours, Monday – Friday, and water would be used to suppress dust from the construction activities. Impacts to visual resources by the Preferred Alternative would be direct, minor to major, short-term to long-term, beneficial, and local.

Cumulative Effects

Future park development and construction activities would have small, localized areas of disturbance that may be within the view of visitors. The Preferred Alternative would be beneficial to visual resources by restoring the landscape and viewshed to natural conditions, which would also enhance the visitor experience. The Preferred Alternative combined with the past, present, and foreseeable future actions that may result in increased impacts to visual resources would result in minor to major, short-term to long-term, beneficial, and local cumulative impacts.

Conclusions

The Preferred Alternative would result in direct, minor to major, short-term to long-term, beneficial, and local impacts. Cumulative effects under this alternative would be the same as the Preferred Alternative, which is minor to major, short-term to long-term, beneficial, and local.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

3.8.3 Public Health and Safety

NPS 2006 Management Policies states park managers should strive to protect human life, as well as provide injury free visits and a safe and healthful environment for visitors and employees.

3.8.3.1 Affected Environment

The existing wastewater system is over 30 years old and is showing signs of inadequacy. Currently, the wastewater system serves the visitor center, maintenance annex, and residential homes. Annual visitation in 2008 to WUPA was approximately 245, 700, and water usage was 869,400 gallons. The increased annual visitation to the visitor's center combined with the residential homes, and maintenance annex connected to the wastewater system far exceeds the design capacity of the evaporative sewer lagoons. The employees would continue to be exposed to handling of raw sewage and confined spaces. A variety of problems with blocked piping and general poor design of the sewer lagoons have resulted in violations to the Arizona Department of Environmental Quality (ADEQ) and U.S. Public Health Service regulations over the years.

3.8.3.2 Methodology and Intensity Thresholds

The thresholds of change for the intensity and duration of an impact are defined as follows:

Impact Intensities and duration definitions for Public Health and Safety

Negligible	A change in public health and safety that is not measurable or perceptible.
Minor	A change in public health and safety that is slight and localized with few measurable consequences.
Moderate	A change to public health and safety that is readily apparent with measurable consequences.
Major	A severely adverse or exceptionally beneficial change in public health and safety.
Duration	Short-term - A public health resource change that would last several minutes to one day. Long-term – A public health resource change that would last more than one day.

3.8.3.3 Analysis of Alternatives and Impacts on Public Health and Safety

Impacts of Alternative I: No Action Alternative

There would be no change to the current wastewater system under the No Action Alternative. Annual visitation would continue to exceed the designed capacity of the existing evaporative sewer lagoons. The wastewater system would continue to have blocked pipes periodically, employee exposure to raw sewage, and to not meet the ADEQ and US Public Health Service standards. The No Action Alternative would result in minor to moderate, long-term, adverse, local impacts due to continued employee exposure to raw sewage, blocked pipes, and not meeting US Public Health Service standards.

Cumulative Effects

Future park development and construction activities may increase wastewater flow, and the existing evaporative sewer lagoons are inadequate to handle the potential increase. The No Action Alternative combined with the past, present, and foreseeable future actions that may result in increased impacts to health and safety, would result in minor to moderate, long-term, adverse, local cumulative impacts.

Conclusions

The No Action alternative would result in minor to moderate, long-term, adverse, and local impacts due to the continued periodic pipe blockage, employee exposure to raw sewage, and not meeting US Public Health Service standards. Cumulative effects under this alternative would be minor to moderate, long-term, adverse, and local.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

Impacts of Alternative II: The Preferred Alternative

The replacement of the existing treatment and disposal methods with a 12,000 gallon septic tank, 3,000 gallon recirculation tank, one 1,000 gallon discharge septic tank, a fabric filtration system, new gravity pipes installed via trenching, and a new drainfield would benefit public health and safety. The replacement of the existing evaporative lagoons would meet the ADEQ and US Public Health Services standards and be able to accommodate the current and future wastewater use for visitors, residents, and employees. In addition, installing new treatment and disposal structures would eliminate handling of raw sewage by employees and eight confined spaces (manholes). The Preferred Alternative would result in direct, moderate, long-term, beneficial, and local impacts.

Cumulative Effects

Future park development and construction activities would have the potential to increase wastewater flow, which the new treatment and disposal structures would be able to accommodate. The Preferred Alternative would allow the wastewater system to comply with the ADEQ and US Public Health Service standards, and would allow the monument to accommodate the current and future wastewater use for visitors, residents, and employees, and would eliminate employee exposure to raw sewage and eight confined spaces (i.e., manholes). The Preferred Alternative combined with the past, present, and foreseeable future actions that may result in increased impacts to public health and safety, would result in direct, moderate, long-term, beneficial, and local cumulative impacts.

Conclusions

The Preferred Alternative would result in direct, moderate, long-term, beneficial, and local impacts. Cumulative effects under this alternative would be minor, short-term, adverse, and local due to the compliance with ADEQ and US Public Health Service standards.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of WUPA; (2) key to the natural or cultural integrity of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the monument's resources or values.

4.0 CONSULTATION AND COORDINATION

4.1 External Scoping

External scoping is done to inform the public and various agencies about the proposed wastewater system rehabilitation project at WUPA and to generate feedback on the prepared Environmental Assessment.

External scoping was conducted through distribution of a scoping letter to inform the public and various agencies about the proposed wastewater system rehabilitation project at WUPA and to generate feedback on the prepared Environmental Assessment. The scoping letter dated August 9, 2010 was sent to 92 addressees including landowners adjacent to the Monuments, various federal and state agencies, US senators, affiliated Native American tribes, local governments, and local news agencies. Information on the environmental assessment was also posted on the NPS Planning, Environment, and Public Comment website (PEPC) at <http://parkplanning.nps.gov/>.

The Environmental Assessment will be available for public comments for 30 days; the comments are due by September 9, 2010.

Addressees included local landowners, state and local government officials and:

Federal Agencies

U.S. Forest Service

U.S. Fish and Wildlife Service

Advisory Council on Historic Preservation

U.S. Geological Survey, Southwest Biological Science Center

State Agencies

Arizona Department of Game and Fish

Arizona Dept. of Water Resources

Arizona Dept. of Environmental Quality

Arizona Dept. of Transportation, Flagstaff District

Arizona State Land Department, Forestry Division

Arizona State Historic Preservation Office
Arizona Public Service
Arizona Archeological Society

Affiliated Native American Groups

Navajo Nation
Zuni Heritage and Historic Preservation Office
Hopi Tribe, Hopi Cultural Preservation Office
Hualapai Tribe San Juan Southern Paiute Tribe
Havasupai Tribe
White Mountain Apache Tribe
Yavapai Prescott Indian Tribe
Yavapai-Apache Nation
Tonto Apache Tribe
San Juan Southern Paiute Tribe
Kaibab Band of Paiute Indians
San Carlos Apache
Fort McDowell Yavapai

4.2 Internal Scoping

Internal scoping was conducted by an interdisciplinary team of professionals from the WUPA Flagstaff Area National Monuments and Ecosystem Management, Inc consultants. Interdisciplinary team members met on October 29, 2009 to discuss the purpose and need for the project; various alternatives; potential environmental impacts; past, present, and reasonably foreseeable projects that may have cumulative effects; and possible mitigation measures. A site visit was conducted on October 29, 2009.

Internal scoping was conducted by an interdisciplinary team of professionals from the WUPA Flagstaff Area National Monuments on February 10, 2010 to discuss potential topics to retain for further analysis.

4.3 Environmental Assessment Review and List of Recipients

The Environmental Assessment will be released for public review on ____, 2010. To inform the public of the availability of the Environmental Assessment, NPS will publish and distribute a letter or press release to various agencies, tribes, and members of the public on the National Park's mailing list, as well as place an ad in the local newspaper. Copies of the Environmental Assessment will be provided to interested individuals upon request. Copies of the document will also be available for review at the FLAG Headquarters and WUPA visitor center, and on the internet at www.nps.gov/wupa.

The Environmental Assessment is subject to a 30-day public comment period ending , 2010. During this time the public is encouraged to post comments online at <http://parkplanning.nps.gov/> or mail comments to Superintendent, Diane Chung, Flagstaff Area National Monuments; 6400 N. Highway 89, Flagstaff, Arizona 86004. Following the close of the

comment period, all public comments will be reviewed and analyzed prior to the release of a decision document. NPS will issue responses to substantive comments received during the public comment period, and will make appropriate changes to the Environmental Assessment as needed.

4.4 List of Preparers

Preparers that helped to develop EA content:

Stephanie Lee, Biologist, Ecosystem Management, Inc.

Mike Tremble, Ecosystem Management, Inc.

Lisa Leap, Chief of Cultural Resources, Flagstaff Area National Monuments, Flagstaff, AZ

Chris Donnermeyer, Compliance Archaeologist, Flagstaff Area National Monuments, Flagstaff, AZ

Paul Whitfield, Natural Resource Specialist, Flagstaff Area National Monuments, Flagstaff, AZ

5.0 REFERENCES

Executive Orders

Executive Order 11988 (Floodplain Management)

Executive Order 11990 (Protection of Wetlands)

Executive Order 12898 (Environmental Justice in Minority Populations and Low-income Populations)

Executive Order 13007 (Indian sacred sites)

NPS Director's Orders

DO-12 Conservation Planning, Environmental Impact Analysis and Decision Making

DO-24 Museum Collections

DO-28 Cultural Resource Management

DO-47 Sound Preservation and Noise Management

DO-77 Natural Resources Management Guideline (NPS-77)

DO-77-1 Wetland Protection

DO-77-2 Floodplain Management

Federal Government

36 CFR Parks, Forests, and Public Property

40 CFR Protection of Environment

50 CFR Wildlife and Fisheries

1916 Organic Act

1963 Clean Air Act, as amended

1964 Wilderness Act

1966 National Historic Preservation Act

1969 National Environmental Policy Act

1970 General Authorities Act

1972 Clean Water Act

1973 Endangered Species Act

1979 Archeological Resources Protection Act

1981 Farmland Protection Policy Act

1993 Government Performance Results Act

Secretarial Order No. 3175 – Departmental Responsibilities for Indian Trust Resources

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**APPENDIX A:
USFWS T&E Data Request Response Letter**

United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Field Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513



In Reply Refer to:

AESO/SE
22410-2010-TA-0234

February 12, 2010

Ms. Stephanie Lee
Ecosystem Management, Inc.
4004 Carlisle Boulevard Northeast, Suite C
Albuquerque, New Mexico 87107

RE: Proposed Sewer Wastewater System Replacement Project for Wupatki National Monument, Coconino County, Arizona

Dear Ms. Lee:

Thank you for your January 11, 2010, request for our review of the proposed sewer wastewater system replacement project for Wupatki National Monument, Coconino County, Arizona. We received your request for comments and a species list on January 13, 2010. The proposed action is to replace the existing wastewater system to meet the U.S. Public Health Service standards, and to accommodate the current and predicted annual visitation numbers, and to relocate the wastewater system outside the viewshed from the visitor's center. The project is located in Township 25 North, Range 10 East, section 30, at the visitor's center. The proposed system would include one 12,000 gallon septic tank, one 3,000 gallon recirculation tank, a fabric filtration system, 250 feet of PVC forcemain, 25 feet of six inch PVC manifold pipes, and 608 feet of drainfield chambers. The existing evaporative lagoons would be filled and the sewer structures would be disposed at an approved location. Approximately 0.49 acre within the proposed project area would be impacted.

We have no concerns regarding impacts to wildlife or habitat from the proposed action. There are no listed species that occur within or adjacent to the project area.

We appreciate your coordination on this and other projects. We also encourage you to coordinate the review of this project with the Arizona Game and Fish Department. If you have any questions in regard to our review of the project, please contact Shaula Hedwall at (928) 226-0614 (x103) or Brenda Smith (x101) of our Flagstaff Suboffice.

Sincerely,

Steven L. Spangle
Field Supervisor

APPENDIX B:

Federally-listed species, other agency “sensitive species”, or “species of concern” known to occur or potentially occur within Wupatki National Monument (WUPA)

COMMON NAME	SCIENTIFIC NAME	STATUS	LOCATION
<i>Wildlife Species:</i>		(1)	(2)
endemic pseudoscorpion Wupatki Earthcrack System	<i>Archeolarca welbourni</i>	NPS SC	WUPA (confirmed)
endemic pseudoscorpion Wupatki Earthcrack System	<i>Pseudogarypus hypogeus</i>	NPS SC	WUPA (confirmed)
Golden Eagle	<i>Aquila chrysaetos</i>	NPS SC	WUPA (confirmed)
Western Burrowing Owl	<i>Athene cunicularia</i> ssp. <i>Hypugaea</i>	USFWS SC	WUPA (confirmed)
Ferruginous Hawk	<i>Buteo regalis</i>	USFWS SC	WUPA (potential)
Wupatki pocket mouse	<i>Perognathus amplus</i> ssp. <i>cinerus</i>	USFWS SC	WUPA (confirmed)
Gunnison’s prairie dog	<i>Cynomys gunnisoni</i>	AZ WSC	WUPA (confirmed)
American pronghorn	<i>Antilocapra americana</i>	NPS SC	WUPA (confirmed)
Townsend's big-eared bat	<i>Corynorhinus townsendii</i> spp. <i>pallascens</i>	USFWS SC	WUPA (confirmed)
spotted bat	<i>Euderma maculatum</i>	USFWS SC	WUPA (confirmed)
western small-footed myotis bat	<i>Myotis ciliolabrum</i>	USFWS SC	WUPA (confirmed)
fringed myotis bat	<i>Myotis thysanodes</i>	USFWS SC	WUPA (confirmed)
big free-tailed bat	<i>Nyctinomops macrotis</i>	USFWS SC	WUPA (confirmed)
<i>Plants:</i>			
Peeble's bluestar	<i>Amsonia peeblesii</i>	NPS SC	WUPA (confirmed)
Beath milkvetch	<i>Astragalus beathii</i>	BLM Sensitive	WUPA (potential)
Marble Canyon milkvetch	<i>Astragalus cremnophylax</i> var. <i>hevronii</i>	USFS Sensitive	WUPA (potential)
Cameron water parsley	<i>Cymopterus megacephalus</i>	USFWS SC	WUPA (confirmed)
clustered barrel cactus	<i>Echinocactus</i> <i>polycephalus</i>	AZ SR, NPS SC	WUPA (confirmed)
roundleaf errazurizia	<i>Errazurizia rotundata</i>	BLM Sensitive	WUPA (confirmed)

Arizona walnut	<i>Juglans major</i>	NPS SC	WUPA (confirmed)
Fickeisen plains cactus/Fickeisen pincushion cactus	<i>Pediocactus peeblesianus</i> var. <i>fickeiseniae</i>	ESA Candidate	WUPA (potential)
Simpson plains cactus	<i>Pediocactus simpsonii</i>	AZ SR	WUPA (confirmed)
cinder phacelia	<i>Phacelia serrata</i>	USFWS SC	WUPA (confirmed)
Welsh's ladies tresses	<i>Phacelia welshii</i>	USFWS SC	WUPA (confirmed)
common reed	<i>Phragmites australis</i>	NPS SC	WUPA (confirmed)
Whiting's indigo bush	<i>Psoralea thompsoniae</i> var. <i>whitingii</i>	USFWS SC	WUPA (confirmed)

(1) Status Acronyms

ESA Candidate – Candidate species for listing as “Threatened” under the Endangered Species Act

USFWS SC – Identified by the U.S. Fish & Wildlife Service as a “species of concern”

AZ WSC – “Wildlife species of concern” identified by the Arizona Game & Fish Dept.

AZ SR – Listed under the Arizona Native Plant Law as “Salvage restricted”

BLM Sensitive – Identified in Bureau of Land Management planning documents as a “sensitive species”

USFS Sensitive – Identified in USDA Forest Service planning documents as a “sensitive species”

NPS SC – Identified in the recent General Management Plans for WUPA, SUCR, and WACA as a “species of special management concern”

(2) Occurrence Record

Confirmed = museum voucher, published account, or NPS written record on file

Potential = suitable habitat but no occurrence record

References

Arizona Game & Fish Department. 2009. List of protected and sensitive species for Coconino County, Arizona. Heritage Data Management System, via the internet at www.azgf.com.

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