



National Park Service
U.S. Department of the Interior

Grand Canyon National Park
Arizona

FINDING OF NO SIGNIFICANT IMPACT

TRANSCANYON WATER DISTRIBUTION PIPELINE

Recommended:

ACTING FOR

Christine S. Lehnertz
Superintendent, Grand Canyon National Park

3-15-19

Date

Approved:

Kate H H D

Kate Hammond
Acting Regional Director, Intermountain Region, National Park Service

May 6, 2019

Date

INTRODUCTION

In compliance with the National Environmental Policy Act (NEPA), the National Park Service (NPS) prepared an Environmental Assessment (EA) to examine alternative actions and environmental impacts associated with the proposed project to relocate the intake for the Transcanyon Water Distribution Pipeline (TCWL) from Roaring Springs to an area along Bright Angel Creek near Phantom Ranch and replace portions of the TCWL between Phantom Ranch and Indian Garden in Grand Canyon National Park (park). The project is needed because the TCWL, which was constructed in the 1960s, is beyond its useful life, experiences frequent failures, and requires continual maintenance to repair leaks.

The statements and conclusions reached in this Finding of No Significant Impact (FONSI) are based on documentation and analysis provided in the EA and associated decision file. When necessary, relevant sections of the EA are incorporated by reference below.

SELECTED ACTION AND RATIONALE FOR THE DECISION

The NPS has selected Alternative B – Relocate Water Intake (hereinafter referred to as the “selected action”), which was identified as NPS preferred alternative in the EA, for implementation.

The selected action will improve the water delivery system to the South Rim and Cross Canyon Corridor. The NPS will relocate the water intake for the TCWL from Roaring Springs to an area along Bright Angel Creek near Phantom Ranch and replace sections of the TCWL between Phantom Ranch and Indian Garden.

With the relocated intake, Bright Angel Creek will provide drinking water to Phantom Ranch, Indian Garden, and the South Rim.

The selected action includes the following elements:

- Phantom Ranch: Relocated water intake (shallow alluvial wells or surface water intake), raw water storage tank, booster pump station, pump station, local water treatment plant (WTP), and potable water storage tank
- Indian Garden: Local WTP and potable water storage tank
- 3 miles of pipeline replaced from Phantom Ranch to Indian Garden
- South Rim: Local WTP, expanded helibase and contractor staging and operations area, and a new access road
- Upgrade existing electrical line from the South Rim to Phantom Ranch

The construction timeframe for the selected action, including work on the South Rim, is estimated to be 4 to 5 years. Work in the inner canyon, including the Cross Canyon Corridor, is expected to occur over an approximately 3-year period.

Up to four construction camps will be established in the Cross Canyon Corridor. Construction staff for the South Rim WTP will be housed in developed areas, inside or outside the park, possibly in Flagstaff, Williams, or other nearby communities.

On the South Rim, an expansion of the existing helibase, a contractor operations and staging area, and a new access road will be constructed. These will all be located near the existing maintenance facility and helibase.

Trail and campground closures are anticipated throughout the project. Trail closures on the Bright Angel and River Trails will be intermittent. Bright Angel Campground and Phantom Ranch may be closed for up to 8 nonconsecutive months during the approximate 3-year inner canyon construction. Indian Garden Campground will be partially used by contractors (approximately half of the sites in the campground) for up to 24 months with a full closure of the campground for up to 6 nonconsecutive months.

Helicopters will be used for the inner canyon work and will include light-duty, medium-lift, and heavy-lift helicopters. A total of approximately 5,500 roundtrip helicopter flights are estimated for the selected action. The light-duty, quiet technology, helicopter is expected to make multiple flights per day, while the medium-lift helicopter will be used less often and the heavy-lift helicopter will be used infrequently to transport equipment that exceeds the payload capacity of the other helicopters. It is estimated that the light-duty helicopter would account for about 66% of total flights, while the medium and heavy-lift would account for 30% and 4% of total flights respectively. The park currently operates about 1,200 to 1,500 administrative helicopter flights per year (up to 12 flights, averaging 18 minutes per flight or approximately 3.5 hours per day) for search and rescue, fire, and maintenance activities. The selected action will result in an increase of approximately 1,800 project-related flights per year, therefore the number of flights would increase from the current level of 1,500 to about 3,300 per year (up to 20 flights, averaging 18 minutes per flight or approximately 6 hours per day) for a period of 3 years during construction in the inner canyon. These flights will occur intermittently throughout the day and to a variety of locations. There will be approximately 18 hours, or more, each day without administrative flights. There will be days when no administrative helicopter use will occur based on weather or other constraints. On average the park has 40 days per year when the helicopter cannot fly and up to 75 when there are restrictions on flights such as only flying in the morning in monsoon season.

Rationale

Alternative B was selected because it best meets the purpose of taking action to provide a reliable water delivery system to meet water supply needs at the South Rim and in the Cross Canyon Corridor for a project lifespan of approximately 50 years. The selected action also best meets the project objectives to:

- Improve the TCWL's water delivery system reliability and resiliency
- Minimize disruptions to visitor access and services during construction
- Minimize impacts on visitor experience and wilderness character during and after construction
- Maintain the historic character of the Cross Canyon Corridor Historic District (CCCHD)
- Minimize impacts on archaeological sites and ethnographic resources
- Minimize visual and noise impacts on special status wildlife from helicopter use and other construction activities

The selected action best meets the purpose, need, and objectives because it will relocate the water intake for the TCWL and eliminate 9 miles (an area known as the “box”) of pipeline that experience the most frequent, and difficult to repair, breaks; the location of the new intake along Bright Angel Creek would be fed by multiple tributaries in addition to Roaring Springs making the source more resilient; construction duration and number of helicopter flights is expected to be considerably less than the replacement of the pipeline in its current location; there will be fewer impacts to visitors due to the reduced construction duration and because there will be less work and fewer temporary closures along North Kaibab Trail; and there will be less impact to archaeological sites because of the limited work on the North Kaibab Trail.

Mitigation Measures

The following, mitigation measures/best management practices were added after preparation of the EA and are based on public comment and agency consultations. These do not change the analysis presented in the EA. Refer to Appendix A for a complete list of all mitigation measures/best management practices that will be implemented for the selected action.

- Light and heavy construction equipment will not be used within 0.5 mile from Mexican spotted owl nest/roost sites during the owl breeding season (March 1 to August 31)
- The NPS will implement erosion and sediment control mitigation measures to prevent runoff and sediment discharges into Bright Angel Creek
- The NPS will monitor incidental take resulting from the selected action and report the findings to the U.S. Fish and Wildlife Service (USFWS)
- The NPS will continue to work with the USFWS and the Arizona Game and Fish Department to implement actions to recover humpback chub and other native aquatic species in GRCA
- The NPS will monitor the screen and proper functioning condition of the water intake pipe and report the findings to the USFWS
- The NPS will locate facilities outside of the 500-year floodplain, where feasible, to avoid floodplain related risk. If facilities must be located within the 500-year floodplain, the design flood elevation is the higher between the 100-year flood elevation plus up to two feet of freeboard or that of the 500-year flood elevation. If facilities must be located within the 500-year floodplain, NPS will include mitigation measures in the design of those facilities based on the design flood elevation
- During design development, renewable energy technologies will be considered where feasible
- A quiet technology light-duty helicopter will be specified in the contract for the selected action
- Project helicopters will generally fly between 8 am and 5 pm each day with generally no flights between 5 pm and 8 am
- Invasive plant control will occur for 3-5 years following construction of new facilities and related ground disturbance on the South Rim and in the Cross Canyon Corridor The NPS Vegetation Program will be responsible for securing funding and completing this work
- The NPS project lead will contact the park's Vegetation Program Manager or designee 6 months in advance to provide input on salvage potential (specifically ponderosa pine saplings on the South Rim) and tree avoidance at project sites where necessary

- The NPS project lead will consult the park's Interpretation and Resource Education Division Chief and Science and Resource Management program managers to determine what natural materials should be retained for use in interpretive or educational programs
- To the extent possible the NPS will coordinate any flow changes with natural flow regime, for example increased flows to Bright Angel Creek at Roaring Springs will be coordinated with natural precipitation events or snow melt

PUBLIC INVOLVEMENT/AGENCY CONSULTATION

Initial public scoping for the project occurred from July 5, 2017 through August 7, 2017. The EA was made available for public review and comment during a 30-day period, from October 10, 2018 through November 10, 2018. Twenty-nine public correspondences were received during review of the EA.

Project goals and the resulting adverse effects on cultural resources have been explicitly addressed in a Programmatic Agreement (PA) between the Arizona SHPO and Grand Canyon National Park, signed February 1, 2019. The Advisory Council on Historic Preservation (ACHP) did not choose to participate in the PA process. The PA was filed with the ACHP on March 4, 2019.

The American Indian tribes traditionally associated with the park were consulted throughout the EA process starting in 2017. Letters, emails and meetings were utilized to share project information with tribes. In 2017, the park received letters from the Havasupai Tribe and Hopi Tribe and also met with the Havasupai Tribal Council to discuss the project. The Havasupai Tribal Council expressed a number of comments including a request that the NPS hire a tribal monitor to be onsite for much of the project to protect cultural resources and asked that any pipeline that would no longer be used be removed from the park; both of these requests were included in the EA and PA. In a letter mailed on October 15, 2018 the tribes were provided with the finding of adverse effect, draft PA, and EA with a request for comment. On December 4 and 5, 2018 park staff followed up with phone calls to tribal contacts. The final PA was mailed to tribes on December 20, 2018. The NPS received one letter in response to the EA and PA from the Hopi Tribe dated December 31, 2018. In the letter the tribe stated that they would not be signing the PA; however, requested continuing consultation throughout project implementation. This comment is consistent with the process that is described in the PA.

In a biological assessment (BA) submitted to the USFWS dated September 17, 2018 the NPS determined that the selected action may affect, but is not likely to adversely affect the Mexican spotted owl, California condor, humpback chub critical habitat, and the razorback sucker and its critical habitat; and may affect and likely to adversely affect humpback chub. The NPS also determined that the selected action will have no effect on Mexican spotted owl critical habitat, southwestern willow flycatcher, western yellow-billed cuckoo, Yuma clapper rail, Kanab ambersnail, and sentry milk-vetch. The USFWS concurred with this determination in a letter and accompanying biological opinion dated March 4, 2019.

FINDING OF NO SIGNIFICANT IMPACT

As described in Chapter 1 of the EA, the following resource topics were carried forward for detailed analysis: Bright Angel Creek native fish, special status terrestrial wildlife, historic buildings and structures and cultural landscapes, archaeological and ethnographic resources

and traditional cultural properties, visitor use and experience, wilderness character, backcountry commercial use socioeconomics, and soundscape and acoustic environment. The potential for significant adverse impacts on these resources has been analyzed, taking into account context and the relevant consideration from the Council on Environmental Quality regulations at 40 Code of Federal Regulations (CFR) 1508.27(b), as follows:

- Impacts that may be both beneficial and adverse. A significant impact may exist even if the federal agency believes that on balance the effect will be beneficial
- Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas
- The degree to which the potential impacts are highly uncertain or involve unique or unknown risks
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources
- The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973
- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts

Taking these considerations into account, as described below, the NPS has determined there will be no significant adverse direct, indirect, or cumulative impacts for any of the resources.

Bright Angel Creek Native Fish

As described beginning on page 24 of the EA, there could be adverse impacts on native fish in Bright Angel Creek, including the federally listed endangered humpback chub and razorback sucker, although razorback sucker are currently not known to be present in the creek. Because of these potential impacts on the fish and their habitat, including critical habitat for the federally-listed species, the park prepared a Biological Assessment (BA), for compliance with Section 7 of the Endangered Species Act for the project. Through this analysis, the NPS found that the selected action may affect, and will likely adversely affect humpback chub as described below. However, despite the potential for impacts on the razorback sucker and critical habitat for both species (also described below), the NPS determined the selected action may affect, but is not likely to adversely affect razorback sucker, their designated critical habitat or humpback chub critical habitat. The USFWS concurred with this determination in a letter dated March 4, 2019.

Construction and staging activities may result in increased sedimentation in Bright Angel Creek during the 3-year construction period in the inner canyon. However, NPS will design elements of the selected action to minimize runoff and sedimentation. Increased turbidity levels caused by construction and staging activities will not be measurable compared to Bright Angel Creek turbidity levels during natural high-flow flood events. In addition, native fish in Bright Angel Creek are adapted to turbid conditions and therefore the limited increases in sedimentation during construction would not have adverse impacts on native fish.

An increase in brown trout could occur with a decrease in water temperature in the Bright Angel Creek. The NPS will monitor temperatures in Bright Angel Creek following relocation of the TCWL intake and increase nonnative fish removal efforts if monitoring indicates that conditions have changed to favor nonnative brown trout. As noted in the BA, Bright Angel Creek is not considered critical habitat for any of the listed fish species. And while a potential increase in brown trout going into the Colorado River (critical habitat) could occur, it would not impact the habitat for native fish. Therefore, there will not be adverse effects on the native fish community or critical habitat from potential increases in brown trout.

Relocation of the water intake, resulting in increased flow and related decreased water temperature, will increase the number of days suitable for growth of the humpback chub and benefit this species. There will also be a slight decline in the number of days suitable for humpback chub to reproduce, but the decline in suitable days for reproduction will be minimal compared to the 1 to 2 month reproduction timeframe for this species. Rearing habitat for humpback chub will increase, which will benefit this species, especially when combined with the increase in the number of days suitable for growth.

If an instream water intake is constructed, larval fish may be entrained or trapped against the screen, resulting in adverse impacts to native fish, including humpback chub. The mortality of larval native fish as a result of entrainment into the surface water diversion (estimated at several thousand per year) will not have impacts that will be at a level that will cause a viability concern or threaten populations because the natural mortality of fish during larval life stages is high (more than 90%) and it is estimated that native fishes produce hundreds of thousands of larval fish each year.

Considering the limited potential for adverse impacts that would not cause any concerns about viability of Bright Angel Creek native fish populations, the impacts will be less than significant.

Cumulative impacts on Bright Angel Creek native fish from past, present, and reasonably foreseeable future actions would be beneficial as described in the EA. The selected action, as described above and in the EA, would result in very few adverse impacts to native fishes from construction of a surface water intake. When the effects of the selected action are combined with the effects of other past, present, and reasonably foreseeable future actions, the total cumulative impacts would be beneficial with the selected action slightly offsetting these beneficial impacts. Therefore, there would be no significant adverse cumulative effects on Bright Angel Creek native fish.

Special Status Species Terrestrial Wildlife

California Condor. As described beginning on page 30 of the EA, potential direct and indirect adverse effects on California condors include disturbance from noise, attraction to human activity, and risk of collision with aircraft.

In the past two years, the park's wildlife biologists have not received any reports of condors landing or occurring in the project area, but they do occur nearby and in the cliffs above the project area. As a result, noise from project activities over the 4 to 5 year project duration could result in flushing birds from perching, roosting, or scavenging sites or temporarily affecting foraging and reproductive behavior for up to 6 hours most days of the 4 to 5 year project duration. However, to reduce noise impacts from helicopters, helicopters associated with the

project will stay at least 1 mile away from active condor nest locations except when human safety would be compromised (USFWS 1996b). This will minimize potential impacts on foraging, breeding, and nesting, by individual condors. In addition, the park contains 1.1 million acres of condor habitat and is surrounded by similar habitat types in every direction.

As mentioned in the alternative description, the total number of helicopter flights will increase from 1,200-1,500 to about 3,300 per year for a 3-year construction period in the inner canyon. It is assumed that the increased number of helicopter flights under this alternative will increase the overall risk that a condor could collide with a project-related helicopter, and any collision with a condor will be a catastrophic accident for both the bird and the aircraft. However, flights will occur intermittently throughout the day with approximately 18 hours free of administrative flights and days when no administrative helicopter use will occur (see information provided in the alternative description for specific information). Helicopters will also maintain at least a 1,200-foot buffer from condors in the air. If condors approach a helicopter, the aircraft will move away, reducing potential disturbance and risk of collision. Given NPS helicopter pilots have never reported collisions or near misses of condors, and condors are highly visible due to their size, it should be possible to avoid collision in the future. Additionally, condors are less frequently at rim level in winter when there is likely to be more helicopter flights, further minimizing the potential for collisions. Regular communication between the park's wildlife staff and helibase crew will also reduce the likelihood of shared airspace with condors. Therefore, although the chance of an aircraft strike exists, the likelihood is very low.

As described in the BA, condors are naturally curious and have been attracted to areas of high human activity within Grand Canyon Village and Desert View on the South Rim of the park. Condor injuries can be related to human activities such as poisonings or power line collisions (neither of which have occurred in the park). In the past, they would land near construction sites or near humans, however, as the condor population has aged and matured, this behavior has become less common. In addition, critical habitat for the California condor does not exist within the park. The BA prepared by the park for the project found that the selected action may affect, but is not likely to adversely affect, the California condor, and will have no effect on its critical habitat. The USFWS concurred with this determination in a letter dated March 4, 2019.

Considering the limited potential for noise impacts and collisions with individual California condors as described above, and taking into account the results of consultation under the Endangered Species Act, the selected action will not have population level effects on California condors and will be less than significant.

Mexican Spotted Owl. As described beginning on page 30 of the EA, potential adverse effects on Mexican spotted owls will occur from removal of and changes to habitat for prey species and increased noise from construction and helicopter flights.

The construction of an expanded helibase, contractor operations and staging areas, and a South Rim WTP will remove up to 16 acres out of more than approximately 17,000 acres of ponderosa pine forest habitat on the South Rim within the park. These 16 acres do not support nesting Mexican spotted owls (the nearest nesting area is more than 0.5 mile away), so the selected action would not result in the loss of Mexican spotted owl nesting areas. In addition, effects on foraging will be small because of the abundant ponderosa pine forest surrounding the project area. Changes to the riparian area below Indian Garden are not expected to impact foraging

opportunities for owls because use of the area is thought to be related to increased rodent activity in the campground nearby not the riparian area itself.

Implementation of the selected action would occur outside of all Protected Activity Center (PAC) boundaries, avoiding impacts on the most important Mexican spotted owl habitat. In addition, increased noise from mechanized equipment and helicopters will primarily occur more than 0.5 mile from known Mexican spotted owl PACs and nest or roost sites which will minimize disturbances to owls that use these PACs. However, two elements of the project will occur within 0.5 mile of a PAC boundary – upgrading the aboveground electrical line from the rim to Indian Garden and construction at Indian Garden. The electrical line will be upgraded outside of breeding season to avoid adverse impacts to reproducing owls. Construction at Indian Garden and for the electrical line will occur during the day and will not impact nocturnal owl foraging.

As described previously, the selected action will result in an increase in total helicopter flights, flights per day and flight hours per day. However, Indian Garden is already a developed area with high levels of daily activity, including helicopter flights. In addition, flights will occur intermittently throughout the day with approximately 18 hours free of administrative flights and days when no administrative helicopter use will occur (see information provided in the alternative description for specific information). Helicopters will also remain at least 1,200 feet from the boundary of any designated PAC or above the PAC during the breeding season to avoid impacts on Mexican spotted owls.

The selected action could indirectly impact up to 5 of the 54 PACs in the park as described above. The selected action will not physically modify habitat within PACs or suitable habitat and therefore will not result in any loss or alteration of Mexican spotted owl critical habitat. The selected action would also have limited potential on foraging owls as described above. In addition, the BA prepared by the park for the selected action found that the selected action may affect, but will not adversely affect, the Mexican spotted owl, and will have no effect on its critical habitat. The USFWS concurred with this determination in a letter dated March 4, 2019. As a result, adverse impacts on Mexican spotted owls will be less than significant.

Desert Bighorn Sheep. As described beginning on page 32 of the EA, increased noise from construction and helicopters could also affect bighorn sheep during the 3-year construction period in the inner canyon. An estimate of approximately 16,500 acres, of 1.1 million acres, of bighorn sheep habitat will be impacted by noise up to 6 hours per day (approximately 18 hours without noise). These effects may discourage bighorn sheep from using areas along or near the helicopter flight path during the 3-year construction period in the inner canyon. Helicopter use in lower elevation areas in the canyon during the February to May lambing season could result in increased stress and vigilance of individual female bighorn sheep which would result in decreased reproduction for those individuals. However, no known concentrations of bighorn sheep occur in this 16,500 acre area. In addition, helicopters will remain at least 1,500 feet from the ground except when approaching a landing site or dropping a sling load, minimizing the potential for disturbances to bighorn sheep.

In the context of the larger bighorn sheep population in the Grand Canyon, more than 1.1 million acres below the canyon rim in the park and on surrounding public and tribal lands are available for bighorn use. Those sheep that may be affected will move to other areas during construction and may eventually return to these areas after construction is complete. Therefore,

the selected action will not affect parkwide or regional populations and adverse impacts on bighorn sheep will not be significant.

Special Status Bat Species. As described beginning on page 32 of the EA, the primary impact on special status bat species will be from intermittent noise and vibration from project activities over the 4- to 5-year project duration. Repeated disturbance at a roost or hibernation site may cause bats to abandon the site and move into a less favorable alternative site. Because of the large size of the park and abundance of cave and cliff roosting and hibernation sites, as well as tree roosting and hibernation sites available, these effects will be limited mostly to the local area around the TCWL. Removal of trees on up to 16 acres (some trees may be left in place for shade and aesthetics) of ponderosa pine habitat could negatively affect tree-roosting bat species. These impacts will be mitigated by removing trees on the South Rim in the winter when tree-roosting bats are less likely to be present. Reduction of water flow in Garden Creek, due to no longer releasing overflow water from Roaring Springs, will result in changes to the insect community, which is a food source for foraging bats, including changes in insect availability, abundance, or species composition.

Given the wide-ranging foraging behavior of most bat species, the presence of extensive similar habitat nearby (e.g., over 17,000 acres of ponderosa pine habitat on the South Rim in the park and up to 30 acres of foraging habitat within a mile of the Garden Creek outflow), foraging habitat loss will not have a discernible negative effect on these species. Additionally, adverse impacts will occur in localized areas in the Cross Canyon Corridor and on the South Rim and will not result in population level impacts in the park or region. For these reasons, adverse impacts on bats will be less than significant.

Cumulative Impacts for Special Status Species Terrestrial Wildlife. Cumulative impacts to special status terrestrial wildlife from past, present, and reasonably foreseeable future actions would be adverse as described in the EA; however, these adverse impacts would be small because best management practices (BMPs) would be used to reduce impacts and the areas disturbed would be relatively small. As described above and in the EA, the selected action will contribute limited negative effects on special status terrestrial wildlife from the loss of 16 of 17,000 acres of foraging habitat for bats and Mexican spotted owl; and from intermittent noise disturbance from construction and helicopter flights on California condor, Mexican spotted owl, bighorn sheep and bats. Thus, when the effects of the selected action are combined with the effects of other past, present, and reasonably foreseeable future actions, the total cumulative impacts will be negative, with a slight adverse incremental contribution from the selected action. Therefore, there would be no significant adverse cumulative effects to special status species terrestrial wildlife.

Cultural Landscapes and Historic Buildings and Structures

Cross Canyon Corridor Historic District. As described beginning on page 39 of the EA, the selected action will temporarily affect visual and audible characteristics during construction and will have a permanent visual impact on the Cross Canyon Corridor Historic District (CCCHD). Visual impacts will occur during the 3 years of construction, primarily from trenching needed to replace 3 miles of pipeline and install 1.5 miles of new 2-inch waterline. Trails and lands impacted by trenching will be reconstructed in-kind once construction is complete. Contractor camps and staging areas will be established and will cause temporary visual impacts to the district, from wall tents or similar structures in camps and storage of materials and equipment in

staging areas, until they are removed after project completion. All ground-disturbing activities have the potential to uncover and disturb previously unidentified historic properties; however, surveying and monitoring will minimize the potential for impacts on these resources.

The selected action will also result in adverse impacts to the setting of the district from introduction of 8 new facilities (5 buildings and 3 water tanks) in the CCCHD, split between Phantom Ranch and Indian Garden. The new structures at Phantom Ranch will primarily be constructed in the delta area near other administrative facilities, such as the non-historic wastewater treatment plant. In this delta area there are currently nine buildings, six of which are non-contributing to the CCCHD. The architecture of any new buildings or structures will be compatible with historic structures in the areas in color, materials, design, massing, and visual scale. Introduction of new structures will permanently affect the CCCHD, however these impacts will not degrade the district enough to impact its eligibility for National Register of Historic Places (National Register) listing because enough of the original contributing resources (36 buildings, 23 structures, 3 objects and 1 grave site) will remain to convey significance; therefore, the adverse effects will be less than significant. To ensure appropriate treatment of historic properties, the NPS and SHPO signed a PA with stipulations on February 1, 2019 for the treatment of historic properties that may be adversely affected by project implementation.

Transcanyon Waterline Historic District. As described beginning on page 41 of the EA, the selected action will impact the Transcanyon Waterline Historic District (TCWL Historic District) from pipeline replacement, repair and maintenance of the Silver Bridge, and construction of new water treatment systems. Replacement of existing 6” aluminum pipe with 8” steel pipe between Phantom Ranch and Indian Garden will adversely impact one of the character defining features of the pipeline, the material. However, replacement will retain the structure’s function and association, spatial relationships, and engineering and design. In order to partially mitigate the adverse effects, the park commissioned Historic American Engineering Record (HAER) documentation for the TCWL Historic District in 2015; NPS will work with SHPO to determine where representative samples of the original pipeline should remain in place; and NPS will design interpretive signs and materials to convey the significance of the pipeline to visitors and staff.

Replacement of or upgrades to existing electrical lines and introduction of new infrastructure in developed areas will introduce new permanent visual elements to the TCWL Historic District, adversely impacting the feeling, setting, workmanship, and materials (aspects of integrity) of the TCWL Historic District

To ensure appropriate treatment of historic properties, the NPS and SHPO signed a PA with stipulations on February 1, 2019 for the treatment of historic properties that may be adversely affected by project implementation.

The above adverse impacts will not degrade the TCWL Historic District enough to impact its eligibility for National Register listing because enough of the original materials (4 buildings, 1 site and 15 structures) will remain to convey significance; therefore, the adverse effects will be less than significant.

Routine maintenance of the Silver Bridge will be beneficial for this contributing structure to the TCWL Historic District and the beneficial impacts will last until the bridge requires maintenance again, which is expected to be about 10 years.

Cumulative Impacts for Cultural Landscapes and Historic Buildings and Structures.

Cumulative impacts to cultural landscapes and historic buildings and structures from past, present, and reasonably foreseeable future actions would be both beneficial and adverse as described in the EA. Adverse impacts related to past projects have resulted in the incremental introduction of modern materials to the CCCHD and TCWL Historic Districts which diminishes the historic feeling, materials, and workmanship (aspects of integrity) of these districts. However, these materials have not diminish either district enough to impact their eligibility for National Register listing because enough of the original materials would remain to convey the significance of the districts. The selected action will add a slight contribution of adverse impacts but would not result in the diminishment of either district enough to impact their eligibility for National Register listing. Therefore, overall cumulative impacts would continue to be both beneficial and adverse, and adverse cumulative effects would not be significant.

Archaeological Resources, Traditional Cultural Properties and Ethnographic Resources

As described beginning on page 45 of the EA, construction of the facilities at Indian Garden and from removal and replacement of the TCWL from Phantom Ranch to Indian Garden will result in potential direct adverse effects on three archaeological sites and indirect adverse effects on six other archaeological sites. Archeological sites are also considered traditional cultural properties and ethnographic resources.

The three archeological sites that will be directly damaged in the Cross Canyon Corridor may lose integrity that could affect eligibility for listing on the National Register. However, two of the three sites that will be impacted were already disturbed when the pipeline was originally constructed in the 1960s. In addition, mitigation measures such as data recovery will be implemented to preserve archaeological information that contributes to the sites' meaning, significance, and interpretation.

Potential indirect effects will occur to six other archaeological sites as a result of erosion or visual impacts (for example a new building in view of an archaeological site, ethnographic site, or traditional cultural property) from construction activities. It is unlikely that these impacts will affect National Register eligibility of the sites, because they will not be directly physically altered. Further, stabilization of these sites would be considered in the future if needed.

Ground disturbance on up to 41 acres will occur, including between Phantom Ranch and Indian Garden, at Phantom Ranch, at Indian Garden, and on the South Rim. It is possible that additional archaeological resources could be uncovered during construction. If additional resources are uncovered, work will stop and NPS cultural resource staff will be contacted to develop a strategy to protect the resources if possible, which will lessen the potential for adverse impacts and maintain the integrity of any newly discovered resources for listing on the National Register.

The NPS will comply with the stipulations outlined in the PA signed by the NPS and SHPO on February 1, 2019 to ensure the proper treatment of archeological sites that will or may be adversely affected by project implementation. Having a monitor on-site will also minimize the potential for inadvertent damage to an archaeological resource, ethnographic resource, or

traditional cultural property. The South Rim area is particularly important to the Havasupai tribe, therefore NPS will work closely with them to identify any resource concerns or monitoring needs.

In addition to archeological sites, ethnographic resources and traditional cultural properties include vegetation, wildlife and springs. Given the limited potential for impacts to these resources described above and in other sections of the FONSI (i.e. Bright Angel Creek Native Fish), the selected action will not have significant impacts on archeological sites, ethnographic resources and traditional cultural properties.

Cumulative impacts to archaeological resources, traditional cultural properties and ethnographic resources from past, present and reasonably foreseeable future actions would be adverse as described in the EA. Collectively, these actions would have very little adverse effects because monitoring would be implemented to ensure avoidance or minimizing of impacts. Because monitoring will occur and resources will be identified very few adverse impacts are anticipated, however, some adverse impacts could occur to previously unknown or buried archaeological and ethnographic resources. The selected action will contribute slightly to, but will not substantially change these adverse cumulative impacts, which would not be significant.

Visitor Use and Experience

As described beginning on page 50 of the EA, implementation of the selected action will improve the long-term reliability of the water distribution and water delivery to all visitor facilities in the analysis area, resulting in a beneficial impact on visitor use and experience. Benefits will affect more than 6 million annual visitors to the South Rim and Cross Canyon Corridor. These benefits will extend for the lifespan of the project, which is expected to be about 50 years. Although impacts will be beneficial after construction, adverse impacts will occur during construction.

Construction will result in temporary trail closures and cancellation of mule trips from the South Rim to Phantom Ranch during the three-year construction period in the inner canyon. However, temporary trail closures are not expected to exceed a few days at a time. When commercial mule rides from the South Rim to Phantom Ranch are suspended, up to 20 people per day (10 riders in and 10 riders out allowed each day) will be impacted. Mule rides on the South Rim and North Rim will continue to operate; therefore, mule ride experiences will still be available in the park.

Construction will also result in closure of Indian Garden Campground for a total of 6 nonconsecutive months, and closure of Phantom Ranch for up to 8 nonconsecutive months during the 3-year construction period in the inner canyon.

These closures and limitations on campsites in the inner canyon will affect access to the Cross Canyon Corridor which is the most popular place to backpack in the Grand Canyon. With these closures, it is possible that visitors will seek backcountry permits for areas outside the corridor. However, closures of Indian Garden Campground and Phantom Ranch are not expected to occur at the same time. While closure of Phantom Ranch, both the lodge and the campground, could impact many of the overnight opportunities in the Cross Canyon Corridor (there are three campgrounds and one lodge total), other similar camping opportunities in the park's backcountry will continue to be available. A closure of Phantom Ranch will result in the loss of

less than 12% of backcountry permits parkwide leaving almost 90% of backcountry permits available. And closure of Indian Garden will impact no more than 20% (or 50 of 255 people) of the overnight opportunities in the Cross Canyon Corridor which represents a loss of 5.8% of backcountry permits parkwide leaving approximately 94% of backcountry permits still available.

In addition, adverse impacts on visitors will be somewhat mitigated by advertising closures in advance on the park's website so that visitors can select other times to visit or make arrangements to backpack outside of the Cross Canyon Corridor.

During removal and replacement of portions of the TCWL, periodic shutdowns of the TCWL will be required. It is anticipated that a majority of visitor facilities will remain open and these periodic shutdowns will only impact a small percentage of visitors. However, in the unlikely event that water in existing storage tanks at Phantom Ranch, Indian Garden, and South Rim is depleted, some visitor facilities could be closed temporarily. If this happens, water may be trucked to the South Rim from other sources; however, water will not be trucked to supply Indian Garden or Phantom Ranch. Because all backcountry visitors, including those hiking to Indian Garden and Phantom Ranch, are encouraged to carry personal water filtration, backcountry visitors would still have access to drinking water which would minimize adverse impacts of water shutdowns.

Visitor experience will also be adversely impacted by the increase in helicopter flights from noise and from seeing helicopters in the canyon. While the selected action will result in an increase in total helicopter flights, flights per day and flight hours per day, flights will occur intermittently throughout the day with approximately 18 hours free of administrative flights and days when no administrative helicopter use will occur (see information provided in the alternative description for specific information).

Over the 6 to 12 month construction period on the South Rim, visitors to this part of the park will be impacted during the day by noise and construction traffic. These impacts will occur primarily in the vicinity of the proposed water treatment plant that is near the Grand Canyon Visitor Center and the concessioner operated Trailer Village. However, because the construction area is located near development and roads the construction is not expected to change visitor activities and use of the park.

The park will advertise trail closures, detours, and other closures in advance, which will reduce impacts on visitors by allowing visitors to adjust their plans.

Although the impacts on visitor use and experience described above will occur during the 3-year construction period in the inner canyon, and 6 to 12 months on the South Rim, the effects on visitor access and visitor uses will be periodic and temporary. Given that nearly 90% to 95% of backcountry permits will still be available and visitation to the South Rim is not expected to change, adverse impacts to visitor use and experience would not be significant. .

Cumulative impacts to visitor use and experience from past, present and reasonably foreseeable future actions would be beneficial as described in the EA. Adverse impacts will occur during construction and long-term beneficial impacts of the selected action will result from the improved water delivery system. While the adverse impacts during construction would slightly offset some of the beneficial effects from other cumulative actions, the improved reliability of

the water distribution and water delivery to all visitor facilities in the analysis area would contribute substantially to the overall cumulative beneficial impact on visitor use and experience. Therefore, there would be no significant adverse cumulative impacts.

Wilderness Character

As described beginning on page 59 of the EA, adverse impacts on the wilderness characteristics of natural, solitude and opportunities for primitive and unconfined recreation will occur. There will be no impacts to the wilderness characteristics of untrammeled, undeveloped, and other features and values. The selected action will include an increase in helicopter flights over a small portion of proposed wilderness. The flight path for the increased number of flights (5,500 over 3 years) from the helibase to the Cross Canyon Corridor will occur approximately 66,918 acres of the 1.1 million acres of proposed wilderness parkwide, potentially increasing visual encounters and noise from aircraft and adversely affecting the natural wilderness value and opportunities for solitude and primitive and unconfined recreation. Although 6.7% of proposed wilderness may be impacted the majority of these acres are not accessible to visitors due to the rugged terrain. Visitors will most likely be impacted while hiking on the trails and will not have their entire trip disturbed by noise as described elsewhere in the FONSI. However, the rugged terrain also provides sound buffering that lessens the distance that sound can carry; therefore these estimates are much higher than what can be heard on the ground.

Impacts on Bright Angel Creek Native Fish and Special Status Species described previously will also affect the natural quality of wilderness character. These impacts will be temporary and will not cause any species listed in the analysis to be displaced permanently or jeopardize their future existence in the park.

In terms of adverse effects on opportunities for solitude and primitive and unconfined recreation, visitors may have their wilderness values impacted in the short term by construction noise from the non-wilderness corridor that will occur in the daylight hours; however noise levels will vary on whether the equipment is running and the topography of the area (See Soundscape and Acoustic Environment below for anticipated sound levels for helicopters and construction equipment). Also, visitors may have their wilderness values impacted in the short term by helicopters flying to the Cross Canyon Corridor (average 18 minutes per flight-only a portion over proposed wilderness) and could result in up to 6 hours of flight time per day. Visitors along portions of the Tonto Trail or off trail in proposed wilderness areas will experience adverse impacts on the high flight days. However, visitors will still have opportunities for solitude and primitive and unconfined recreation because these flights will occur intermittently, and much of the day (generally more than 18 hours) will be free of flight noise associated with the project. In addition, there will days when no administrative helicopter use will occur based on weather or other constraints. On average the park has 40 days per year when the helicopter cannot fly and up to 75 when there are restrictions on flights such as only flying in the morning in monsoon season.

During construction, wilderness character (natural quality and solitude and primitive and unconfined recreation) will be adversely affected by administrative helicopters and activities associated with the project. The adverse effects on the natural wilderness value and opportunities for solitude and primitive and unconfined recreation will last for approximately three years and after construction these impacts will cease. However, impacts will not be significant when considering the limited area affected compared to the area of proposed

wilderness in the park and considering natural character and opportunities for solitude and primitive and unconfined recreation will not be permanently altered or compromised.

Past, present and reasonably foreseeable future actions would have small adverse cumulative impacts on the wilderness qualities of natural and solitude and primitive and unconfined recreation and would not permanently alter or compromise the associated wilderness characteristics and desired conditions. The selected action will result in some adverse effects related to increased noise from construction, including helicopter flights over proposed wilderness. The incremental impacts of the selected action will contribute slightly to, but will not substantially change, the adverse impacts occurring to wilderness character. Therefore, there would be no significant adverse cumulative effects.

Backcountry Commercial Use Socioeconomics

As described beginning on page 62 of the EA, direct and indirect impacts to commercial operations will occur from lost revenue due to intermittent trail and facility closures during the 3 year construction period in the inner canyon. When construction is complete, concessioners and backcountry commercial operators will have a more reliable water delivery system, resulting in a long-term beneficial impact.

Adverse impacts during construction will include periodic closures of the Bright Angel, Colorado River, and North Kaibab Trails of no more than a few days at a time and potential closure of Phantom Ranch for up to 8 nonconsecutive months over a 3-year period. Xanterra, the concessioner that operates Phantom Ranch, could lose up to \$3.5 million, or approximately 5% of their gross annual Grand Canyon revenue, if Phantom Ranch were closed during the busiest 8 months of one year. If the closures were spread out across 3 years, with 2-3 of the busiest months closed each year, lost gross annual revenue for Xanterra could be approximately \$1 to 1.5 million (1.5-2.2% of total gross Grand Canyon revenue). Commercial companies, known as commercial use authorization (CUA) holders, that operate backpacking trips in the Cross Canyon Corridor will be impacted by the closures of Phantom Ranch, Indian Garden Campground, and Bright Angel Campground. Impacts to CUA holders over 3 years could result in a loss of \$1 to \$2 million in total revenue for all companies depending on when closures occur. This is an average of approximately 9-19% loss of total annual revenue for all CUA holders and some of this loss could be mitigated by seeking other opportunities, including backcountry permits outside of the Cross Canyon Corridor.

Based on the fact that CUA holders have other opportunities inside and outside the park, the selected alternative is not expected to impact the viability of individual businesses. In addition, the NPS met with CUA holders in 2018 to discuss projects and potential closures in the canyon. The CUA holders did not express concerns at that time or submit any comments on the EA.

Periodic shutdowns of the TCWL will be required during construction, and water may not be available as the storage tanks can supply water for 2 to 3 days at Phantom Ranch and 2 to 3 weeks at the South Rim. The risk of depleting existing water supplies at Phantom Ranch and the South Rim could result in cancellations of visitor reservations and, in turn, a reduction in concessioner revenues. This risk will be reduced to low by planning shutdowns to avoid the busiest times at the South Rim and avoid depleting water supplies.

Considering the periodic and temporary nature of the closures and the fact that concessionaires and CUA holders will still be able to generate at least 80 to 95% of their average revenue during the construction period, adverse impacts to backcountry commercial use socioeconomics will not be significant.

Cumulative impacts to backcountry commercial use socioeconomics from past, present and reasonably foreseeable future actions would be beneficial as described in the EA. The selected action, specifically, trail and facility closures, will result in limited adverse impacts in the form of losing between 2% and 20% of revenue for the concessioner and CUAs. The selected action will also result in long term beneficial impacts from the improved water distribution system. While the adverse impacts during construction would slightly offset some of the beneficial effects from other cumulative actions, the improved reliability of the water distribution and water would contribute substantially to an overall cumulative beneficial impact on backcountry commercial use socioeconomics. Therefore, there would be no significant adverse cumulative impacts.

Soundscape and Acoustic Environment

As described beginning on page 68 of the EA, use of helicopters, construction equipment, and generators will adversely affect the acoustic environment. The selected action will result in an increase in total helicopter flights, flights per day and flight hours per day. However, flights will occur intermittently throughout the day with approximately 18 hours free of administrative flights and days when no administrative helicopter use will occur (see information provided in the alternative description for specific information).

Noise impacts from helicopters, at 200 feet, will range from 60 dBA (similar to a busy restaurant) for the smallest most used aircraft to 99.6 dBA (similar to a jackhammer at 2 meters) for the largest least used aircraft. Visitors will not likely be within 1000 feet of a hovering helicopter sling load when noise is the loudest (heavy lift helicopter will be approximately 80 dBA at 1000 feet). Based on complex terrain and limited line of sight, distance of attenuation to ambient within the canyon will likely not extend beyond approximately 2 to 3 miles.

Vehicles and equipment at construction areas may generate noise over the full duration of daylight hours; however, noise levels will vary over the course of a day depending on whether vehicles and equipment are running. Noise levels from construction equipment will range from 69.8 to 84.4 dBA (similar to a curbside of a busy street) and sound will attenuate to ambient levels within 0.5 mile.

Although adverse impacts will occur on the acoustic environment, impacts will not be significant because noise will be concentrated closest to the flight paths and in close proximity to construction at Phantom Ranch, Indian Garden, and along the TCWL between Phantom Ranch and Indian Garden. Outside of these areas, the acoustic environment will be relatively unaffected by the selection action.

Cumulative impacts to soundscape and acoustic environment from past, present and reasonably foreseeable future actions would be adverse as described in the EA and errata. As noted in the errata, NPS acknowledges that there will be some cumulative impacts from commercial air tours. NPS found that there is a potential for overlap of intermittent noise from commercial air tours and project flights on approximately 17,000 acres below the canyon rim (or 28,000 acres including above and below the canyon rim in the park). The selected action will result in

increased noise from helicopter flights and construction equipment and will contribute modestly to these adverse cumulative impacts. Cumulative impacts would not be significant because the cumulative impact analysis area only includes a small portion of the air tour routes; noise would not be constant but rather intermittent for minutes at a time; there would be 14 or more hours each day without noise impacts from helicopters (commercial air tours and project) or construction equipment; and noise from these flights and construction would only be heard in a few locations at the same time, such as along the Tonto Trail between Bright Angel and Hermit Trails, due to canyon topography and sound attenuation.

CONCLUSION

As described above, the selected action will not have a significant effect on Bright Angel Creek native fish, special status terrestrial wildlife, cultural landscapes, historic buildings and structures, archaeological resources, traditional cultural properties, ethnographic resources, visitor use and experience, wilderness character, backcountry use commercial services, and soundscape and acoustic environment. Additionally, there will be no significant impacts on public health, public safety, or unique characteristics of the region. No highly uncertain or controversial impacts, unique or unknown risks, significant cumulative effects, or elements of precedence were identified. Implementation of the NPS selected action will not violate any federal, state, or local environmental protection law. Therefore, it has been determined that there will be no significant adverse impacts on the human environment, and in accordance with Section 102(2)(c) of NEPA, an EIS is not required for this project, and thus will not be prepared.

Appendix A Mitigation Measures

To minimize impacts related to the selected action, the National Park Service (NPS) will implement Best Management Practices (BMPs) and resource protection measures.

WILDLIFE

- Grand Canyon National Park's (park) Parkwide Spill Response Plan will be used by park employees and contractors to prevent potential poisoning of wildlife and soil and water contamination.
- Project sites will be cleaned up at the end of each day the work is being conducted (e.g., trash disposed of/secured appropriately and scrap materials picked up) to minimize the likelihood of California condors visiting the site. Park wildlife program staff will conduct periodic spot checks to ensure adequate project clean-up measures are being appropriately undertaken.
- Trash and recycling receptacles and all dumpsters will be wildlife-proof certified and will be tightly covered to avoid wildlife access.
- Wildlife will not be fed or approached.
- Project staff will be instructed to avoid interaction with condors and to immediately contact park wildlife program staff or park dispatch if condors visit a project site.
- If condors visit a project site, project activities will cease until the condors leave on their own or until techniques, such as hazing, are employed by permitted park personnel that result in the condors leaving the area.
- Because condors are less active in the morning hours, pilots will be encouraged to conduct flights prior to 10 am when possible.
- Pilots will minimize aircraft use along the rim and cliffs to the greatest extent possible.
- Except for authorized biologists trained in survey techniques, helicopters and fixed-wing aircraft will avoid operating within 1,000 feet of eagle nests during the breeding season (currently there are no known nests in the park). Potentially disruptive activities will be minimized in the eagles' direct flight path between their nest and roost sites and important foraging areas. Regardless of season, aircraft corridors will be located no closer than 1,000 feet vertical or horizontal distance from communal eagle roost sites, where possible.
- The NPS project lead will contact the park's wildlife program manager concerning the presence/absence of threatened or endangered species using nearby cliffs/canyons. The park's wildlife program manager will be contacted a minimum of 2 weeks prior to project commencement and regularly throughout the project to determine if additional avoidance measures are needed due to condor and Mexican spotted owl locations.
- Helicopters will stay at least 1 mile away from active condor nest locations and vicinities except when human safety will be compromised. The active nesting season is February 1 to September 30. These dates may be modified based on the most current information regarding condor nesting activities (e.g., roosting and fledging) and coordination with the U.S. Fish and Wildlife Service (USFWS).
- Work on the existing aboveground electrical line between the South Rim and Indian Garden, including associated helicopter flights, will occur outside the condor and

Mexican spotted owl nesting seasons. The active condor nesting season is February 1 to September 30. The Mexican spotted owl nesting season is from March to August. These dates may be modified based on the most current information regarding condor and Mexican spotted owl nesting activities (e.g., roosting and fledging) and coordination with the park's wildlife program manager, Section 7 coordinator, and USFWS.

- Helicopters will stay at least 1,200 feet away from condors in the air or on the ground or cliffs unless human safety concerns override this restriction.
- If airborne condors approach aircraft, aircraft will give up airspace to the extent possible, as long as this action does not jeopardize human safety.
- To minimize noise disturbance within Mexican spotted owl Protected Activity Centers (PACs), light helicopters will remain at least 1,200 feet from the boundary of any designated PAC during the Mexican spotted owl breeding season (March 1 through August 31). This distance will increase to 2,000 feet for a S-64 Skycrane or equivalent and to 2,400 feet for a CH-47 Chinook. If nonbreeding is inferred or confirmed during approved protocol surveys in a PAC during the breeding season, restrictions on noise disturbances should be relaxed depending on the nature and extent of the proposed disturbance.
- To reduce noise impacts on bighorn sheep, helicopters will remain at least 1,500 feet above ground level and maintain that distance while in the canyon, except during takeoff, landing, or dropping a sling load.
- Following completion of the project, NPS fisheries staff will monitor Bright Angel Creek for changes in water temperature. If monitoring indicates that substantial temperature changes that could favor brown trout are occurring in the creek, the park will increase removal of nonnative fish.
- Following the completion of the project, NPS wildlife staff will monitor Bright Angel and Garden Creeks for changes in creek morphology that directly impacts habitat availability for amphibians and bats.
- Project staff shall comply with the Migratory Bird Treaty Act (16 United States Code 703). Any active bird nest shall be left in place and undisturbed until the young hatch and depart. Vegetation clearing shall be avoided to the greatest extent possible during the primary nesting season between early April and mid-August. If vegetation clearing must occur within the primary nesting season, surveys for the active nests shall be conducted by a qualified biologist. Vegetation clearing within the primary nesting season shall only be allowed after the qualified biologist determines that no nests are present or they are inactive.
- Disturbance of northern goshawks during the breeding season will be avoided by prohibiting vegetation removal and subsequent construction activity from the proposed contractor equipment and storage area from April 1 through July 31. If vegetation removal is required during this time, a goshawk survey will be conducted for nests. If a nest is found, construction activity and vegetation removal will not occur within a 0.5-mile radius of the nest until the birds have fledged.
- If using erosion netting, biodegradable matting with a large-diameter natural fiber shall be used to prevent entrapment of wildlife.
- Park wildlife biologists will train contractor staff, at the preconstruction meeting, to avoid disturbance to any wildlife species (reptiles, migratory birds, raptors, and bats) found nesting, hibernating, estivating, or otherwise living in, or immediately nearby, work sites.

- For any projects involving trenching or digging holes, provisions (generally in the form of ramps, with a slope less than 45°) must be made every 20 to 50 feet to allow for the escape of animals that may fall into these recesses or they must be covered in such a way as to prevent animals (vertebrates) from falling into them.
- Overall, night work will not be permitted as part of this project, however, there may be some instances when crews mobilize to or from the work site at dawn or dusk, or may need to finish a task at the end of the day. Such instances will only be permitted if they will be short-term, require minimal equipment, and will not occur within 0.5 mile of Mexican spotted owl PAC boundaries.
- Before removing trees on the South Rim, the park will conduct bat surveys to identify which bat species are present. To protect tree-roosting bat species, tree removal on the South Rim will occur only during the winter months (November through February).
- The NPS will monitor temperatures in Bright Angel Creek following relocation of the TCWL intake and increase nonnative fish removal efforts if monitoring indicates that conditions have changed to favor nonnative brown trout.
- Light and heavy construction equipment will not be used within 0.5 mile from Mexican spotted owl nest/roost sites during the owl breeding season (March 1 to August 31).
- The NPS will implement erosion and sediment control mitigation measures to prevent runoff and sediment discharges into Bright Angel Creek.
- The NPS will monitor incidental take resulting from the proposed action and report the findings to the USFWS.
- The NPS will continue to work with the USFWS and the Arizona Game and Fish Department to implement actions to recover humpback chub and other native aquatic species in GRCA.
- The NPS will monitor the screen and proper functioning condition of the water intake pipe and report the findings to the USFWS.

SOUNDSCAPES

- To reduce noise impacts on sensitive wildlife and areas with natural or wilderness characteristics when flying to and from the work area, helicopters will maintain a minimum 2,000-foot altitude where possible, per Federal Aviation Administration (FAA) Advisory Circular 91-36D Visual Flight Rules (VFR) Flight near Noise-Sensitive Areas.
- Helicopter pilots will be encouraged to use quieter maneuvers (ones that produce less noise), wherever possible, according to the Fly Neighborly training available at <https://go.usa.gov/xQPCW> and <https://www.rotor.org/operations/flyneighborly.aspx>.
- Where possible, pumps and generators that do not exceed 60 dBA at 50 feet will be selected per the NPS Audio Disturbances Rule (36 CFR 2.12).
- Except in emergencies, work in the vicinity of campgrounds will be limited to the hours of 6:00 am to 10:00 pm to reduce disturbance during established quiet hours at any campsites that may be affected.
- A quiet technology light-duty helicopter will be specified in the contract for the selected action.
- Project helicopters will generally fly between 8 am and 5 pm each day with generally no flights between 5 pm and 8 am.

VEGETATION

- All revegetation efforts will use site-adapted native seed and plants provided by the park's Vegetation Management Program.
- Disturbed areas will be rehabilitated, as appropriate, to limit invasion and spread of invasive nonnative plants, and mulch will be spread to a depth of 3 to 6 inches, depending on the level of disturbance.
- Equipment and supplies will be staged and stored in already disturbed areas on-site or designated staging areas.
- If erosion-control fencing is used, soil will be piled in front of the fence to avoid creating bare soil and potential for invasive plant species encroachment outside the project area.
- Trenching and construction equipment transported to the site from outside the park will first be pressure washed to minimize the potential to import invasive plant seed and material to the site.
- Pruning necessary for the project will adhere to the park's pruning guidelines with the goal of retaining the health and integrity of trees and shrubs treated. Damage to trees or roots in or adjacent to project sites during construction will be avoided as much as possible and, if avoidance is not possible, root pruning guidelines provided by the park's Vegetation Management Program will be followed.
- Vegetation material removed during the project that is unusable for revegetation efforts will be cut and shredded on-site for use as mulch in the project area.
- Monitoring will occur to track the change in riparian area below the Indian Garden pumphouse.
- Invasive plant control will occur for 3-5 years following construction of new facilities and related ground disturbance on the South Rim and in the Cross Canyon Corridor. The park's Vegetation Program will be responsible for securing funding and completing this work.
- The NPS project lead will contact the park's Vegetation Program Manager or designee 6 months in advance to provide input on salvage potential (specifically ponderosa pine saplings on the South Rim) and tree avoidance at project sites where necessary.

SOILS

- Site disturbance will be limited to approved clearing limits. Clearing limits will be demarcated prior to construction using removable flagging or similar methods. Care will be taken to avoid operating equipment, staging equipment, and storing supplies; and walking or disturbing soils, biotic crusts, natural surfaces, grasses, forbs, shrubs, or other natural materials in areas outside approved clearing limits.
- Lay down of rubber mats or plywood boards under the wheels/tracks of the mechanized equipment will be required in sensitive areas.
- Compacted soils will be scarified and original contours reestablished.
- Use of mechanized equipment will be confined to the smallest possible area and will stay within the defined work corridor.
- Aspen fiber, not straw, will be used for all erosion-control products such as wattles. Coconut fiber materials will be used, rather than jute or other fabrics, for erosion-control blankets on slopes greater than 3:1.

- Any fill materials required for the project will be obtained from a park-approved source in adherence to Standard Operating Procedure 8213-007 Invasive Plant Free Forage and Construction Materials. Intact native topsoil from the project area will be retained whenever feasible.
- Water will be applied for dust abatement at project sites.

CULTURAL RESOURCES

- A NPS cultural resources specialist will monitor all ground-disturbing activities such as excavation or grading. Such work will not proceed without a cultural resource specialist present.
- A tribal resource monitor from the Havasupai Tribe, per the tribe's request, will be invited to be on-site when work is occurring at and near Indian Garden and other areas of interest.
- If during construction previously unknown archeological resources are uncovered, a park cultural resource specialist will be contacted immediately. All work in the immediate vicinity of the discovery will be halted until the resources are identified and documented and an appropriate mitigation strategy developed in consultation with the State Historic Preservation Officer (SHPO) and associated American Indian tribes.
- In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act and the park's Memorandum of Agreement Regarding Collections, Inadvertent Discovery, and Intentional Excavation of Native American Human Remains, Funerary Objects, Sacred Objects, and Objects of Cultural Patrimony will be followed.
- All mitigation measures developed as part of the Programmatic Agreement (PA) with the SHPO and tribes to guide project implementation will be followed in coordination with the park Section 106 coordinator and the park tribal program manager.
- The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes and Director's Order 28: Cultural Resources Management will be followed for this project.
- All workers will be informed of the penalties of illegally collecting artifacts or intentionally damaging any archaeological or historic property.

PALEONTOLOGICAL RESOURCES

- A preconstruction survey for paleontological resources will be conducted.
- Activities will be conducted in a way that will not damage or move inventoried paleontological resources. If concealed paleontological resources are encountered during project activities, all necessary steps will be taken to protect them.
- Although there is no surface evidence of paleontological resources, if concealed paleontological resources are encountered during project activities, all necessary steps will be taken to protect them, and an appropriate mitigation strategy will be developed.
- Resource monitors on the project will be trained to identify paleontological resources.

VISITOR USE AND EXPERIENCE

- Project activities, including trail closures, will be communicated to affected staff and the public through public notification channels.

NIGHT SKY

- The minimum required amount of new lighting will be considered and selected fixtures will meet criteria identified in the park's lighting policy.
- Lighting in the project area will be evaluated to determine if it is necessary and that it meets the park lighting policy to protect the night sky.

FLOODPLAINS

- The NPS will locate facilities outside of the 500-year, where feasible, to avoid floodplain related risk. If facilities must be located within the 500-year floodplain, the design flood elevation is the higher between the 100-year flood elevation plus up to two feet of freeboard or that of the 500-year flood elevation. If facilities must be located within the 500-year floodplain, NPS will include mitigation measures in the design of those facilities based on the design flood elevation.

OTHER

- During design development, renewable energy technologies will be considered where feasible.
- The NPS project lead will consult the park's Interpretation and Resource Education Division Chief and Science and Resource Management program managers to determine what natural materials should be retained for used in interpretive or educational programs.
- To the extent possible the NPS will coordinate any flow changes with natural flow regime, for example increased flows to Bright Angel Creek at Roaring Springs will be coordinated with natural precipitation events or snow melt.

Non-Impairment Determination Transcanyon Water Distribution Pipeline Environmental Assessment

Grand Canyon National Park March 2019

By enacting the NPS Organic Act of 1916 (Organic Act), Congress directed the U.S. Department of the Interior and the National Park Service (NPS) to manage units "to conserve the scenery, natural and historic objects, and wild life in the System units and to provide for the enjoyment of the scenery, natural and historic objects, and wild life in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (54 U.S.C. 100101). NPS *Management Policies 2006*, Section 1.4.4, explains the prohibition on impairment of park resources and values:

"While Congress has given the Service the management discretion to allow impacts within parks, that discretion is limited by the statutory requirement (generally enforceable by the federal courts) that the Park Service must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise. This, the cornerstone of the Organic Act, establishes the primary responsibility of the National Park Service. It ensures that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them."

An action constitutes impairment when its impacts "harm the integrity of park resources or values, including the opportunities that otherwise will be present for the enjoyment of those resources or values" (NPS 2006, Section 1.4.5). To determine impairment, the NPS must evaluate the "particular resources and values that will be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts. An impact on any park resource or value may constitute impairment, but an impact would be more likely to constitute an impairment to the extent that it affects 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 in the park's general management plan or other relevant NPS planning documents as being of significance (NPS 2006, Section 1.4.5).

Fundamental resources and values for Grand Canyon National Park are identified in the enabling legislation for the park, the 1995 General Management Plan, and the 2017 Foundation Document. Based on a review of these documents, the fundamental resources and values for Grand Canyon National Park come from the park's inspirational scenic landscapes, extensive geologic record, dramatic topography and biodiversity, critical water resources, important human history of over 12,000 years, and providing for the benefit, enjoyment, education, and inspiration of this and future generations. Resources that were carried forward for detailed

analysis in the EA for which a non-impairment determination is made include: Bright Angel Creek native fish, special status terrestrial wildlife, historic buildings and structures and cultural landscapes, archaeological and ethnographic resources and traditional cultural properties, and soundscape and acoustic environment. Non-impairment determinations are not made for visitor use and experience or backcountry commercial use socioeconomics because these impact topics are not generally considered to be park resources or values subject to the written impairment determination requirement found in NPS Management Policies 2006. Furthermore, a non-impairment determination is not made for wilderness because this impact topic is not generally considered to be a separate park resource and value subject to the non-impairment standard established by the Organic Act and clarified further in Section 1.4.6 of NPS Management Policies 2006.

This non-impairment determination has been prepared for the selected action, as described in the FONSI for the Transcanyon Water Distribution Pipeline EA.

BRIGHT ANGEL CREEK NATIVE FISH

Bright Angel Creek and its tributaries provide habitat for several species of native fish, including speckled dace, flannelmouth sucker, bluehead sucker, humpback chub, and razorback sucker. Two species that either occur or have the potential to occur, the humpback chub and razorback sucker, are federally listed as endangered. Native fish and their occurrence in Bright Angel Creek are described on pages 22 and 23 of the EA.

Construction and staging activities may result in increased sedimentation in Bright Angel Creek during the 3-year construction period in the inner canyon. However, no adverse effects on native fish in the creek are expected because elements of the selection action will be designed to minimize runoff and sedimentation, and because native fish in Bright Angel Creek are adapted to turbid conditions. Increased flow in Bright Angel Creek, and associated temperature changes, could lead to increased populations on nonnative brown trout, which prey on native fish. The park will monitor temperatures in Bright Angel Creek following relocation of the TCWL intake and increase nonnative fish removal efforts if monitoring indicates that conditions have changed to favor nonnative brown trout. If an instream water intake is constructed, the instream water intake will likely entrain larval fish, or larval fish may be trapped against the screen. The natural mortality of fish during larval life stages is high (more than 90%), and it is estimated that native fishes in the creek produce hundreds of thousands of larval fish each year. For these reasons, it is likely that the mortality of larval native fish as a result of entrainment into the surface water diversion (estimated at several thousand per year) will not have impacts that will be at a level that will cause a viability concern or threaten populations.

The selected action will not result in an impairment of Bright Angel Creek native fish because overall, native fish in Bright Angel creek will remain in a condition that they can continue to be enjoyed by current and future generations.

SPECIAL STATUS TERRESTRIAL WILDLIFE

As described on pages 26 through 28 of the EA, special status terrestrial wildlife potentially affected by the selected action include California condor, Mexican spotted owl, desert bighorn sheep, and several bat species. Special status fish species are addressed under *Bright Angel Creek Native Fish* above.

Potential direct and indirect effects on California condors include disturbance from noise, attraction to human activity, and risk of collision with aircraft. To reduce noise impacts from helicopters, helicopters associated with the project will stay at least 1 mile away from active condor nest locations except when human safety would be compromised. This will minimize potential impacts on condor breeding and nesting. It is possible that a condor could collide with a project-related helicopter; however, no collisions or near misses of condors have ever been reported by NPS helicopter pilots. Helicopters will maintain at least a 1,200-foot buffer from condors in the air. If condors approach a helicopter, the aircraft will move away, reducing potential disturbance and risk of collision. Although the chance of an aircraft strike exists, the likelihood is very low.

Potential direct and indirect effects on Mexican spotted owls will occur from removal of and changes to habitat for prey species. Removing up to 16 acres of ponderosa pine forest habitat near the existing maintenance facility at the South Rim for construction of an expanded helibase, contractor operations, contractor staging areas, and water treatment plant will degrade the quality of Mexican spotted owl foraging habitat. These impacts are more than 0.5 mile from the nearest nesting area, so Mexican spotted owl nesting areas will not be affected and effects on foraging will be small. Changes to Mexican spotted owl foraging habitat along Garden Creek are not expected to substantially affect the owls because foraging habitat is abundant and because Mexican spotted owl use of the area is suspected to be related to increased rodent activity in the campground nearby, not the riparian area itself. Increased noise and activity from construction and helicopter flights will also affect Mexican spotted owls. The use of mechanized equipment and helicopters will occur more than 0.5 mile from known Mexican spotted owl Protected Activity Centers (PACs) and nest or roost sites, with a few exceptions. The normal breeding and roosting behavior of Mexican spotted owls may be affected by these activities for the 4- to 5-year project duration. The selected action will result in an increase in helicopter flights from the current level of about 1,200 to 1,500 per year (up to 12 flights per day) to about 3,300 per year for a period of 3 years (approximately 5,500 total round-trip for the project) during construction in the inner canyon. Helicopters will remain at least 1,200 feet from the boundary of any designated PAC or above the PAC during the breeding season to avoid impacts on Mexican spotted owls. Based on the distance from PACs and implementation of Best Management Practices, noise impacts on roosting or nesting Mexican spotted owls will be minimized to the extent that negative effects from helicopters are not expected to occur.

Increased noise from construction and helicopters could also affect bighorn sheep during the 3-year construction period in the inner canyon. Impacts will be minimized because helicopters will remain at least 1,500 feet from the ground except when approaching a landing site or dropping a sling load. These effects may discourage bighorn sheep from using areas along or near the helicopter flight path during the 3-year construction period in the inner canyon. Bighorn sheep will move to other areas during construction and may eventually return to these areas after construction is complete. In the context of the larger bighorn population in the Grand Canyon, more than 1 million acres below the canyon rim in the park and on surrounding public and tribal lands are available for bighorn use. Therefore, parkwide or regional populations will not be impacted, especially when best management practices are implemented such as requiring helicopters to maintain a distance of 1,500 feet above ground level when flying over bighorn sheep habitat.

The primary impact on special status bat species will be from intermittent noise and vibration from project activities over the 4- to 5-year project duration. Repeated disturbance at a roost or

hibernation site may cause bats to abandon the site and move into a less favorable alternative site. Because of the large size of the park and abundance of cave and cliff roosting and hibernation sites, as well as tree roosting and hibernation sites available, these effects will be limited mostly to the local area around the TCWL. Tree removal during construction, specifically removal of trees that provide roosting habitat, could negatively affect tree-roosting bat species. These impacts will be mitigated by removing trees on the South Rim in the winter when tree-roosting bats are less likely to be present. Given the wide-ranging foraging behavior of most bat species and extensive similar habitat nearby, foraging habitat loss is not expected to have a discernible negative effect on these species.

Although impacts on California condors, Mexican spotted owls, bighorn sheep, and special status bat species may occur during project construction, adverse impacts will cease once construction is complete, and these species will return to a condition similar to current conditions. These species will remain in a condition that can continue to be enjoyed by current and future generations. Therefore no impairment to these species will occur as a result of implementing the selected action.

CULTURAL LANDSCAPES AND HISTORIC BUILDINGS AND STRUCTURES

The selected action will cause temporary impacts during construction on visual and audible characteristics from construction of new buildings and structures and will have a visual impact on the CCCHD. Temporary visual impacts will result from replacement of 3 miles of pipeline and installation of 1.5 miles of new 2-inch waterline. In addition, ground-disturbing activities have the potential to uncover and disturb previously unidentified cultural resources; however, monitoring ground-disturbing activities will occur to minimize impacts on these resources. The pipeline itself is a modern noncontributing structure to the CCCHD; therefore, the removal and replacement of the pipe and possible use of the pipeline as a conduit for the 2-inch waterline will not result in an adverse effect on the CCCHD. The selected action will also result in adverse impacts from introduction of new structures in the CCCHD and replacement of the pipeline in the TCWL Historic District. The architecture of any new buildings or structures will be compatible with historic structures in the areas in color, materials, design, massing, and visual scale. Introduction of new structures will be a permanent adverse effect on the CCCHD and the TCWL Historic District. Replacement of existing 6" aluminum pipe with 8" steel pipe between Phantom Ranch and Indian Garden will adversely impact one of the character defining features of the pipeline, the material. However, replacement will retain the structure's function and association, spatial relationships, and engineering and design. In order to partially mitigate the adverse effects, the park commissioned Historic American Engineering Record (HAER) documentation for the TCWL Historic District in 2015; NPS will work with SHPO to determine where representative samples of the original pipeline should remain in place; and NPS will design interpretive signs and materials to convey the significance of the pipeline to visitors and staff.

None of the above impacts will degrade the districts enough to impact their eligibility for National Register of Historic Places (National Register) listing.

Cultural landscapes, historic buildings, and structures will remain in a condition that allows for continued enjoyment of them by current and future generations. Therefore, implementation of the selected action will not result in impairment to these resources.

ARCHAEOLOGICAL RESOURCES, TRADITIONAL CULTURAL PROPERTIES, AND ETHNOGRAPHIC RESOURCES

Prehistoric and historic archaeological sites are located in the Cross Canyon Corridor, including some that are immediately adjacent to the pipeline. In addition, many American Indian tribes consider the entire Grand Canyon to be a traditional cultural property, and cultural and archaeological sites of importance to many tribes are found throughout the entire project area.

Project activities will result in potential direct adverse impacts on three archaeological sites, also considered traditional cultural properties and ethnographic resources, and indirect adverse impacts on six archaeological sites from construction of the facilities at Indian Garden and from removal and replacement of the TCWL from Phantom Ranch to Indian Garden. Direct impacts will occur from trenching and other ground disturbing activities. Indirect impacts are likely to occur from erosion and visual impacts to these sites. In addition, it is possible that additional archaeological resources could be uncovered during construction. If additional resources are uncovered, work would cease and NPS cultural resource specialists would develop a strategy to protect the resources if possible, which will lessen adverse impacts and maintain the integrity of the resources for listing on the National Register. Having a monitor on-site will also minimize the potential for inadvertent damage to an archaeological resource, ethnographic resource, or traditional cultural property and help ensure that adverse effects are minimized.

The adverse effects on archaeological resources, traditional cultural properties, and ethnographic resources have been resolved through an executed PA between the NPS and SHPO. The PA includes stipulations that the NPS will implement to ensure the proper treatment of historic properties. Archaeological resources, traditional cultural properties, and ethnographic resources will remain in a condition that allows for continued enjoyment of them by current and future generations. Therefore, implementation of the selected action will not result in impairment to these resources

SOUNDSCAPE AND ACOUSTIC ENVIRONMENT

Use of helicopters, construction equipment, and generators under the selected action will adversely affect the acoustic environment. Helicopter flights will generate sustained noise over a period of up to 6 hours per day over a 3-year period when helicopters are used in the inner canyon. Vehicles and equipment at construction areas could generate noise over the full duration of daylight hours; however, noise levels will vary over the course of a day depending on whether vehicles and equipment are running. Noise impacts from helicopters will range from 60 dBA (at close range) for the smallest most used aircraft to 99.6 dBA for the largest least used aircraft. Noise levels from construction equipment will range from 69.8 to 84.4 dBA, and sound will attenuate to ambient within 0.5 mile.

Although the selected action will include increased numbers of helicopter flights that will adversely affect the soundscape and acoustic environment, these adverse impacts will occur only during the 3-year construction period and will be intermittent with each flight lasting approximately 18 minutes with a maximum of 6 hours per day. There will be at least 18 hours free of project related noise each day and approximately 40 days per year without project helicopter flights due to weather constraints. Because impacts will be limited in extent and noise

impacts will be greatly reduced after the 3-year construction period, the selected action will not result in impairment of soundscape and acoustic environment.

CONCLUSION

In conclusion, as guided by this analysis, good science and scholarship, advice from subject matter experts and others who have relevant knowledge and experience, the results of public involvement activities, and best professional judgment, the NPS has determined that implementation of the selected action will not constitute an impairment of the resources or values of Grand Canyon National Park.

REFERENCES

National Park Service (NPS). 2006. NPS Management Policies 2006. Available at: <https://www.nps.gov/policy/mp2006.pdf>.

Errata and Response to Public Comments Transcanyon Water Distribution Pipeline Environmental Assessment

The following errata and response to public comments together with the Finding of No Significant Impact (FONSI) and the Environmental Assessment (EA) describe the final decision of the National Park Service for the Transcanyon Water Distribution Pipeline project.

ERRATA

These errata are to be attached to the Transcanyon Water Distribution Pipeline EA dated October 2018 and are intended to correct or clarify statements in the EA other than typographical and minor editorial errors and to address substantive comments on these documents received during the public review period.

EA text to be deleted is shown as **red strikeout**, and revised or new text is shown as *red italicized text*.

Page 5. Impact Topics Dismissed from Further Analysis. Ponderosa Pine Forest Habitat.

Revised text:

Restoration to preconstruction conditions would take many decades given the growth rate of ponderosa pine, and most of the site would remain unforested. *It is possible that if changes to climate occur little to none of the disturbed areas would ever be restored.*

Page 5. Impact Topics Dismissed from Further Analysis. Wetlands.

Revised text:

Disturbance from trenching through the creeks and wetland areas would be less than 0.1 *acre*.

Page 16. Helicopter Operations

Revised text:

Based on the weight of material and equipment needed for construction, it is estimated that about 5,500 total *round-trip* helicopter flights would be needed over the 3-year construction period in the inner canyon, with about 7 to 12 round-trip flights per day departing from and returning to the expanded helibase at the South Rim on a typical day when helicopters are active.

Page 16. Alternative B. Helicopter Operations.

Revised text:

Alternative B would result in an increase in helicopter flights from the current level of about 1,200 to 1,500 per year (up to 12 flights or approximately 3.5 hours per day) to about 3,300 per year (up to 20 flight or approximately 6 hours per day) for a period of approximately 3 years (approximately 5,500 total round-trip for the project) during construction in the inner canyon. These flights would occur intermittently throughout the day and to a variety of locations. There would be approximately 18 hours, or more, each day without administrative flights. There would be days when no

administrative helicopter use will occur based on weather or other constraints. On average the park has 40 days per year when the helicopter cannot fly and up to 75 when there are restrictions on flights such as only flying in the morning in monsoon season.

Page 31. Special Status Species Terrestrial Wildlife. Environmental Consequences. Alternative B. Mexican Spotted Owl.

Revised text:

The project would remove up to 15 acres of ponderosa pine forest habitat near the existing maintenance facility at the South Rim for construction of an expanded helibase, contractor operations, and contractor staging areas and about 1–2 acres of ponderosa pine habitat for construction of the South Rim WTP. The construction of an expanded helibase, contractor operations and staging areas, and a South Rim WTP will remove up to 16 acres out of more than approximately 17,000 acres of ponderosa pine forest habitat on the South Rim within the park.

Page 32. Special Status Species Terrestrial Wildlife - Environmental Consequences - Alternative B - Desert Bighorn Sheep.

Revised text:

Within the approximately ~~13,000~~16,500-acre area potentially affected by the project, bighorn sheep may experience reduced reproductive success and may abandon these areas due to the repeated helicopter overflights.

Page 33. Special Status Species Terrestrial Wildlife - Environmental Consequences - Alternative B - Special Status Bat Species.

Revised text:

Ponderosa pine habitat would be removed from up to ~~15~~ 16 acres, *of over 17,000 acres of ponderosa pine habitat on the South Rim in the park alone*, for construction of the expanded helibase, ~~and~~ other contractor facilities at the South Rim, ~~and 1–2 acres for construction of~~ the South Rim WTP.

Page 49. Visitor Use and Experience - Affected Environment

Revised text:

The North Kaibab Trail is the least visited and most difficult of the three maintained trails in the ~~park~~ *Cross Canyon Corridor*.

Page 51. Visitor Use and Experience - Environmental Consequences - Alternative B.

Revised text:

During construction and closures along the Bright Angel and ~~North Kaibab~~ *Colorado River* Trails, mule trips from the South ~~and North~~ Rims would be cancelled because operation of construction equipment and additional helicopter flights could scare the mules, creating a safety issue for guests. *When commercial mule rides from the South Rim to Phantom Ranch are suspended, this will impact up to 20 people per day (maximum of 10 riders in and 10 riders out each day). Mule rides on the South Rim and North Rim will continue to operate; therefore, mule ride experiences will still be available in the park...*

...With these closures, it is possible that visitors would seek backcountry permits for areas outside the corridor. *Closures of Indian Garden Campground and Phantom Ranch are not expected to occur at the same time. While closure of Phantom Ranch, both the lodge and the campground, could impact many of the overnight opportunities in the Cross Canyon Corridor (there are three campgrounds and one lodge total), other similar camping opportunities in the park's backcountry will continue to be available. A closure of Phantom Ranch will result in the loss of less than 12% of backcountry permits parkwide leaving almost 90% of backcountry permits available. Closure of Phantom Ranch will be a maximum of 8 nonconsecutive months over the 3 to 4 year construction period in the canyon. Closure of Indian Garden will impact no more than 20% (or 50 of 255 people) of the overnight opportunities in the Cross Canyon Corridor which represents a loss of 5.8% of backcountry permits parkwide leaving approximately 94% of backcountry permits still available. A closure of Indian Garden campground will be no more than 6 nonconsecutive months over the course of the project. With these closures, it is possible that visitors will seek backcountry permits for areas outside the corridor. All of these closures and limitations on campsites in the inner canyon will adversely impact visitor use and experience particularly because the Cross Canyon Corridor is the most popular place to backpack in the Grand Canyon. Adverse impacts on visitors will be somewhat mitigated by advertising closures in advance on the park's website so that visitors can select other times to visit or make arrangements to backpack outside of the Corridor.*

Page 52. Visitor Use and Experience. Environmental Consequences. Alternative B.

Revised text:

The non-wilderness Cross Canyon Corridor is a within a developed backcountry zone with numerous administrative buildings and facilities, electricity, running water, pump station at Indian Garden and wastewater treatment plant at Phantom Ranch. Many of these utilities and facilities produce localized noise at low levels. The new WTPs would introduce some additional localized noise that may be audible directly adjacent to the new infrastructure. However, the new WTPs and pump station at Phantom Ranch will be co-located with existing NPS facilities away from visitor areas (i.e. campgrounds, Phantom Ranch, water filling stations) and therefore the additional noise will not impact visitors.

During construction Alternative B would result in an increase...

Page 58. Wilderness Character. Alternative A.

Revised text:

~~Although these f~~ *Project* flights would be visible and produce noise that would continue to adversely affect opportunities for solitude and primitive and unconfined recreation. ~~there are no trails directly under the flight path~~ *Project flights will cross over the Tonto Trail approximately 14 times with 4 in the non-wilderness Cross Canyon Corridor and 10 in proposed wilderness.* These short-term (average 18 minutes per flight over a portion of proposed wilderness) adverse effects would continue to impact proposed wilderness areas. However, the ongoing adverse effects on solitude and primitive and unconfined recreation would not permanently alter or compromise this wilderness value.

Page 58. Wilderness Character. Alternative A.

Revised text:

Of the 1.1 million acres of proposed wilderness *below the rim* in Grand Canyon National Park, it is estimated that ~~13,000~~ 66,918 acres would be impacted by helicopter flights.

Page 59. Wilderness Character. Alternative B.

Revised text:

Similar to Alternative A the flight path for the increased number of flights (5,500 over 3 years) from the helibase to the Cross Canyon Corridor would occur over a small portion of proposed wilderness ~~with no trails directly under flight path.~~ *Project flights will cross over the Tonto Trail approximately 14 times with 4 in the non-wilderness Cross Canyon Corridor and 10 in proposed wilderness. Noise from the helicopter will be most prevalent directly above locations where the flight path crosses the trail. ~~potentially increasing~~ These flights will increase visual encounters with and noise from aircraft and adversely affecting the natural and opportunities for solitude and primitive and unconfined recreation wilderness values. . . Of the 1.1 million acres of proposed wilderness *below the rim* in Grand Canyon National Park, it is estimated that ~~13,000~~ 66,918 acres would be impacted by helicopter flights. *Although 6.7% of proposed wilderness may be impacted the majority of these acres are not accessible to visitors. Visitors would most likely be impacted while hiking on the trails and would not have their entire trip disturbed by noise. The rugged terrain of these acres limits human access and also provides sound buffering that lessens the distance that sound can carry; therefore these estimates are much higher than what can be heard on the ground.**

Page 60. Wilderness Character. Alternative C.

Revised text:

As under Alternative B, of the 1.1 million acres of proposed wilderness *below the rim* in Grand Canyon National Park, it is estimated that ~~13,000~~ 66,918 acres would be impacted by helicopter flights.

Page 62. Backcountry Commercial Use Socioeconomics - Environmental Consequences - Alternative B.

Revised text:

This is an average of approximately \$333,000 to \$667,000 per year for the three year project duration or approximately a 9-19% loss of total annual revenue for all CUA holders. *Some of this loss could be mitigated by seeking other opportunities, including backcountry permits outside of the Cross Canyon Corridor.*

Page 63. Backcountry Commercial Use Socioeconomics - Environmental Consequences - Alternative B.

Revised text:

The NPS met with CUA holders in 2018 to discuss projects and potential closures in the canyon. The CUA holders did not express concerns at that time or submit any comments on the EA. Based on lack of concerns expressed by CUA holders, and the fact CUA holders have other opportunities inside and outside the park, the selected action is not expected to impact the viability of individual businesses.

**Page 69. Soundscape and Acoustic Environment. Environmental Consequences.
Alternative B. Cumulative Impacts.**

Revised text:

The impacts of past, present, and reasonably foreseeable future actions on soundscape and the acoustic environment would result from administrative helicopter use, *a portion of commercial air tours* and routine trail work in the Cross Canyon Corridor. Trail maintenance activities have had and would continue to have adverse effects on the acoustic environment from use of gas powered tools. Administrative helicopter use to support trail work, remove waste from composting toilets, support search and rescue, and support routine maintenance of buildings in the Cross Canyon Corridor would also result in adverse effects. *Project flights and commercial air tours are 2.75 miles apart at their closest and the flight paths do not cross or intersect. Using a 3 mile buffer around each flight path, NPS found that the overlap in sound will be approximately 17,000 acres below the canyon rim (or 28,000 acres including above and below the canyon rim in the park).* Overall, cumulative impacts from past, present, and reasonably foreseeable future actions would be adverse. As previously described, Alternative B would contribute adverse effects on the acoustic environment. Therefore, when the effects of Alternative B are combined with the effects of other past, present, and reasonably foreseeable future actions, the total cumulative impacts would continue to be adverse, with a ~~considerable~~*modest* contribution from Alternative B which would increase annual administrative helicopter flights in the Cross Canyon Corridor from approximately 1,500 to approximately 3,300 for the anticipated 3 years of inner canyon work.

Pages A1-A6. Best Management Practices

Revised text:

- The NPS will locate facilities outside of the 500-year, where feasible, to avoid floodplain related risk. If facilities must be located within the 500-year floodplain, the design flood elevation is the higher between the 100-year flood elevation plus up to two feet of freeboard or that of the 500-year flood elevation. If facilities must be located within the 500-year floodplain, NPS will include mitigation measures in the design of those facilities based on the design flood elevation.*
- During design development, renewable energy technologies will be considered where feasible.*
- A quiet technology light-duty helicopter will be specified in the contract for the selected action.*
- Project helicopters will generally fly between 8 am and 5 pm each day with generally no flights between 5 am and 8 pm.*
- Invasive plant control will occur for 3-5 years following construction of new facilities and related ground disturbance on the South Rim and in the Cross Canyon Corridor. Vegetation Program will be responsible for securing funding and completing this work.*
- The NPS project lead will contact the park's Vegetation Program Manager or designee 6 months in advance to provide input on salvage potential (specifically ponderosa pine saplings on the South Rim) and tree avoidance at project sites where necessary.*
- The NPS project lead will consult the park's Interpretation and Resource Education Division Chief and Science and Resource Management program managers to determine what natural materials should be retained for used in interpretive or educational programs.*

- *To the extent possible the NPS will coordinate any flow changes with natural flow regime, for example increased flows to Bright Angel Creek at Roaring Springs will be coordinated during natural precipitation events or snow melt.*
- *Light and heavy construction equipment will not be used within 0.5 mile from Mexican spotted owl nest/roost sites during the owl breeding season (March 1 to August 31).*
- *The NPS will implement erosion and sediment control mitigation measures to prevent runoff and sediment discharges into Bright Angel Creek.*
- *The NPS will monitor incidental take resulting from the proposed action and report the findings to the USFWS.*
- *The NPS will continue to work with the USFWS and the Arizona Game and Fish Department to implement actions to recover humpback chub and other native aquatic species in GRCA.*
- *The NPS will monitor the screen and proper functioning condition of the surface water intake pipe and report the findings to the USFWS.*

RESPONSE TO PUBLIC COMMENTS

The Environmental Assessment (EA) was made available for public review, and comments were accepted by Grand Canyon National Park (park) from October 10, 2018 through November 10, 2018.

During the public comment period, the NPS received 29 correspondences through the NPS's Planning Environment and Public Comment (PEPC) system.

Many comments addressed issues already adequately covered in the EA. No comments warranted development of an additional alternative or reconsideration of alternatives that were considered but dismissed. Therefore, the alternatives remain as described in the EA and no changes were made in the assessment of environmental consequences other than what is presented in the errata above.

The public comments and responses are summarized as follows.

Environmental Impacts

COMMENT: One commenter suggested that the EA did not provide sufficient information to determine whether significant impacts would occur, specifically related to visitor experience, concessions operations and commercial service activities.

RESPONSE:

The NPS believes the analysis in the EA, including any changes made based on public comments via errata, is sufficient to support the conclusions reached in the FONSI that the selected action will not cause significant impacts for any resource analyzed.

Comments Suggesting Changes to the Alternatives

Construction Methods and Operations

Comment: Commenters requested that NPS use solar or other renewable energy to power the pump stations.

RESPONSE:

To address this comment, the following BMP/mitigation measure has been added and will not change the analysis presented in the EA.

- During design development, renewable energy technologies will be considered where feasible.

Comment: Commenters raised concerns about the construction time for Alternative B based on the timeframe of a recent pipeline replacement at Phantom Ranch and stated that the project would take longer than 4 to 5 years to complete. Commenters also stated that the number of helicopter flights was underestimated in the EA.

RESPONSE:

The estimated project timeline and number of helicopter flights were developed by NPS staff and a contract engineering firm following a number of studies, site visits, and two constructability charrettes. The charrettes included discussion about the general construction approach, water system operational requirements during construction, construction means and methods, materials, temporary facilities, helicopter use, and project sequencing. This best available information was then used to estimate that the construction time for the selected action will be 4 to 5 years. Lessons learned from the 0.5 mile pipeline replacement at Phantom Ranch completed in 2016, such as flying in contract employees, will be utilized in the project. While best available information was used to develop the project timeline, NPS acknowledges that the project end date may be different and that the project may take longer than 5 years. However, impacts will be spread across the construction timeframe and are not expected to exceed the intensity of impacts described in the EA or FONSI.

Comment: One commenter suggested that the cancellation of mule rides to Phantom Ranch is likely to be longer than 3 years, as stated in the EA.

RESPONSE:

NPS estimated that mule rides to Phantom Ranch would be cancelled for up to 3 years, the estimated duration of the inner canyon construction period that was developed based on best available information described in the response to the previous comment. Closures are most likely to occur when there are many helicopter flights along the route of the mule rides (Bright Angel, Colorado River, and South Kaibab Trail) or when there is construction on or near these trails. NPS expects there will be times when mule rides can operate during the project. NPS will work closely with the concessioner to determine when mule operations need to be suspended and when they can operate.

Comment: One commenter asked NPS to clarify number of flights and whether they are one-way or round-trip.

RESPONSE:

The flight estimates are round-trip (i.e. 5,500 total round-trip for selected action). This change has also been noted in the FONSI and Errata.

Comment: Two commenters expressed questions about the electrical upgrades proposed in the selected action. One asked if the existing powerline has enough capacity for the relocation of the water intake in Alternative B (selected action) and the other requested that NPS expand the three phase power to Phantom Ranch Lodge.

RESPONSE:

The existing electrical capacity would not be able to accommodate the additional needs to implement the selected action. As stated in the EA, the electrical line to the Phantom Ranch area will be upgraded to three phase power to support the additional pump station and water treatment plant described in the selected action. Regarding Phantom Ranch Lodge, expansion of three phase power to the lodge will be included in the electrical distribution component of the selected action.

Suggested Mitigation

Comment: Several commenters asked the NPS to require times with no helicopter flights and suggested designating five respite intervals (one week each) and Sundays as flight-free.

RESPONSE:

NPS will consider specifying respite periods for project flights when a contracting process is initiated for construction of the selected action. If planned respite periods occur for project flights, impacts described in the EA would not change. There will also be unplanned flight free days as there currently are each year due to weather, including wind, snow, monsoons and low visibility. In addition, there will be days when no administrative helicopter use will occur because of weather or other constraints. On average the park has 40 days per year when the helicopter cannot fly and up to 75 when there are restrictions on flights such as only flying in the morning in monsoon season.

Comment: Commenters suggested that the NPS require quiet times with no helicopter air tours or a reduction in air tours to compensate for increased project-related helicopter noise.

RESPONSE:

Management of air tours is outside the scope of this project.

Comment: Commenters requested the NPS implement measures to mitigate noise from helicopters used during construction.

RESPONSE:

The following mitigation measures have been added and will not change the analysis presented in the EA.

- A quiet technology light-duty helicopter will be specified in the contract for the selected action.
- Project helicopters will generally fly between 8 am and 5 pm each day with generally no flights between 5 pm and 8 am.

Comment: One commenter suggested the NPS consider completing work in one area at a time to reduce impacts on concessioners and commercial backpacking companies.

RESPONSE:

The project schedule has not been determined yet; however, the NPS will work with the contractor and concessioners to develop a schedule that will reduce impacts to visitors and concession operations to the greatest extent possible during project implementation.

Comment: One commenter stated that Best Management Practices (BMPs) should be added for control of invasive plants for 3- to 5-years following construction.

RESPONSE:

To address this comment, the following mitigation measure/BMP has been added and will not change the analysis presented in the EA.

- Invasive plant control will occur for 3-5 years following construction of new facilities and related ground disturbance on the South Rim and in the Cross Canyon Corridor. The NPS Vegetation Program will be responsible for securing funding and completing this work.

Comment: One commenter suggested that on the South Rim, the NPS leave some standing large trees where possible, consider transplanting ponderosa pine saplings from project areas before starting work, and preserve materials for interpretive use, such as tree-ring cross sections, bird nests, and other signs of life.

RESPONSE:

For the purpose of analysis in the EA, the NPS assumed that all trees would be removed from project locations; however, the NPS goal is to cut down the minimum number of trees necessary while addressing human health and safety concerns and sustainability of infrastructure. In addition, the following mitigation measures have been added and will not change the analysis presented in the EA.

- The NPS project lead will contact the park's Vegetation Program Manager or designee 6 months in advance to provide input on salvage potential (specifically ponderosa pine saplings to be transplanted on the South Rim) and tree avoidance at project sites where necessary.

- The NPS project lead will consult the park’s Interpretation and Resource Education Division Chief and Science and Resource Management program managers to determine what natural materials should be retained for used in interpretive or educational programs.

Comment: One commenter was concerned with visual impacts, from the South Rim, of the new structures at Phantom Ranch and suggested tunneling into the canyon wall to screen new structures from view as proposed in a 1990s study for a previous water line replacement project.

RESPONSE:

The new buildings at Phantom Ranch will be constructed adjacent to existing NPS buildings in the delta area. The existing buildings are visible from several South Rim overlooks, as will be the new buildings; however, there are numerous overlooks where this area is not visible at all. In addition, as stated in the EA, the buildings will follow NPS standards that require new construction be designed to minimize visual impacts. This will reduce the effect of the new buildings at Phantom Ranch when viewed from the few locations on the South Rim where they would be visible.

The commenter did not provide any documentation regarding the 1990s study cited and the NPS is not aware of this study. The NPS believes the commenter’s suggestion to tunnel into the canyon wall would result in unknown and potentially serious environmental impacts that would make this unreasonable.

Funding

Comment: One commenter asked the NPS to consider public-private partnerships to fund the project and stated that there is no source of funding for Alternatives B and C.

RESPONSE:

The DOI and NPS are committed to funding this high priority project. Funding has been identified in multi-year funding plans, including use of the park’s fee revenue. There may be opportunities in the future for public-private partnerships related to the park’s utility modernization program.

Comments Opposing New Alternatives

Comment: Commenters stated that the NPS should not buy from or sell water to Tusayan.

RESPONSE:

Buying and selling water is outside the scope of this plan.

Comments Proposing New Alternatives

Comment: One commenter stated that the Bureau of Reclamation Study Alternatives 8 (obtain a dependable water supply from water providers or companies) and 9 (truck or train water to the park) are reasonable alternatives and should be analyzed in detail.

RESPONSE:

The Bureau of Reclamation (BOR) completed the study cited by the commenter in 2002 (see https://www.usbr.gov/lc/phoenix/reports/ncawss/allfiles/10_grandcanyon.pdf). While BOR analyzed conceptual alternatives in this study, BOR provided no details on how they would be implemented. The study also noted (on page 5-5), “Concern exists, however, that water shortages in the region could preclude or interrupt water transfers to the Park from a regional source (water companies/communities). Thus, these alternatives are not considered viable unless a regional water supply system can be developed to ensure regional water supplies are available.”

Since BOR completed their study in 2002, no one has developed a dependable, regional water supply that would make these alternatives viable at this time, and commenters did not submit any information that would resolve concerns regarding viability. Therefore, as summarized in the EA, these alternatives face considerable technical, economic, and jurisdictional obstacles, making them remote, speculative, and unable, in a timely manner, to resolve the purpose and need to provide a reliable water delivery system that addresses the fact that the TCWL is beyond its useful life; experiences frequent failures; and requires continual maintenance to repair leaks. Replacement of the TCWL pipeline does not preclude NPS from exploring or participating in regional water solutions in the future.

Comments about Impacts on Resources, Visitors, and Visitor Services

Climate Change

Comment: One commenter suggested the NPS analyze impacts of the proposed project on the flows, water quality, and long-term viability of Bright Angel Creek as a water source in the context of climate change and projected flow reduction in Roaring Springs and Bright Angel Creek.

RESPONSE:

As stated in the EA, water in Roaring Springs comes from a large cave system which is recharged by snowmelt and precipitation (Jones et al. 2017). Preliminary data suggest that changes in snowpack may affect flow at Roaring Springs (Klos et al. 2014; Schwinning et al. 2008; Seager et al. 2007). In comparison, Bright Angel Creek is fed by several tributaries and is not solely reliant on Roaring Springs. In addition, relocating the water intake under the selected action will mean that water will no longer be removed from Roaring Springs, enhancing its resiliency. This will also restore an average of 5% of Roaring Springs flow back into Bright Angel Creek, contributing to the seasonal fluctuation of flows in the creek, and making more water available. The new pipeline will continue to use an average of five percent or less of the total water in Bright Angel Creek at the Phantom Ranch intake location and no more than 25 percent (or 1,000 gallons per minute) of the water in the creek at any one time during periods of the lowest flow

and highest demand. While NPS acknowledges that climate change could contribute to changes in Bright Angel Creek, the NPS does not believe updates to the analysis are necessary because the selected action will not have meaningful impacts to flows, water quality, or the viability of the creek, as described in the EA, FONSI, and response to other comments.

Comment: One commenter stated that the EA should analyze whether 15 to 16 acres of ponderosa pine forest can be restored when considering climate change.

RESPONSE:

The EA states that restoration to preconstruction conditions would take many decades given the growth rate of ponderosa pines and that most of the site would remain unforested. It is possible, that with changes in climate, little to none of the disturbed areas will ever be restored. While up to 16 acres may remain disturbed, as noted in the FONSI, over 17,000 acres of ponderosa pine forest exists within the park on the South Rim. NPS does not believe that this will change the impacts considered in the EA.

Comment: One commenter suggested reducing water use in the park to address climate change and overall water availability.

RESPONSE:

As described in the EA, the NPS proposes to maintain or reduce water usage by utilizing water conservation techniques and technology and by fixing leaks in the systems.

Water Quality

Comment: One commenter stated that the EA did not address water quality and environmental impacts of drawing water from Bright Angel Creek, via well or surface water intake, and did not disclose the results of test drilling conducted along Bright Angel Creek in March 2018.

RESPONSE:

Withdrawing water from Bright Angel Creek using shallow alluvial wells or a surface water intake is not expected to impact the water quality of the creek because water for a surface water intake would be collected passively and neither well nor surface water intake is expected to increase turbidity or change chemical, physical or biological characteristics of the creek. Regarding impacts from drawing water, it is expected that no more than 25% (or 1,000 gallons per minute) of the creek flow will be needed for the water intake at any given time. Further, the pumping will only occur when needed, not 24 hours per day. Design of the intake system will consider drawdown to minimize impacts to the creek. Also, the test well project initiated in April 2018 was intended to determine viability of alluvial wells and inform the design of the intake system, but not intended to inform the analysis in the EA. The test wells were not completed and the results from the few wells that were partially installed were inconclusive. NPS is planning to reinstall test wells and complete the necessary tests in 2019.

Biological Resources

Comment: One commenter asked that the NPS coordinate flow changes that mimic natural flow regimes in Bright Angel Creek and Garden Creek to benefit plants and animals.

RESPONSE:

The following mitigation measure has been added and will not change the impacts described in the EA.

- To the extent possible the NPS will coordinate any flow changes with natural flow regime, for example increased flows to Bright Angel Creek at Roaring Springs will be coordinated with natural precipitation events or snow melt.

Comment: One commenter disagreed with the floodplains dismissal in the EA given the extent of development being contemplated in proximity of the Bright Angel Creek floodplain.

RESPONSE:

As stated in the EA a floodplain analysis for Bright Angel Creek was conducted in 2016. Based on that study Floodplains as an impact topic was considered but dismissed.

Comment: One commenter asked NPS to consider a buffer for condor non-nesting areas to ensure safety of condors and helicopters.

RESPONSE:

The majority of condors in the park are monitored closely using telemetry and park staff generally know where the birds are located. In addition, mitigations in the EA (Appendix A) are designed to ensure communications between park resource management staff and the project manager so that presence of birds can be reported to the helibase to ensure both safety for condors and helicopter operations. For these reasons, buffers are not needed for non-nesting condors.

Safety

Comment: One commenter stated that closing the Bright Angel Trail and having visitors use other trails will create a safety concern due to the lack of water. NPS should consider temporary, alternate locations for water, such as the Kaibab Trail.

RESPONSE:

Periodic closures of trail sections along the Bright Angel and River Trails will be needed during project implementation, but are not expected to last more than a few days. It is anticipated that Bright Angel Trail will remain open to 3 mile resthouse during these periodic closures and water will continue to be available at 1.5 and 3 mile resthouses. Information will be available throughout the project regarding closures and temporary water outages so that visitors can plan accordingly. NPS always recommends that visitors carry sufficient water for their hike into the canyon as water is not always available. NPS is not currently considering supplying water on the

South Kaibab Trail or other locations due to the additional helicopter flights that would be needed and the increased adverse impacts on soundscape, wilderness character, visitor experience and wildlife. Additionally, the cost for helicopters and water combined with complex logistics would make it infeasible to provide a reliable water source. Visitors can also use personal water treatment in Garden Creek and Bright Angel Creek throughout the project.

Visitor Experience and Visitor Services

Comment: Commenters asked that closures of trails, campgrounds, Phantom Ranch and mule operations should be publicized in advance.

RESPONSE:

As stated in the EA, project activities including trail closures would be communicated to affected staff and the public. In addition, NPS will coordinate with the concessioner to provide as much notice as possible when mule operations may be impacted.

Comment: One commenter stated that noise from the water treatment plant (WTP) at Indian Garden and Phantom Ranch will negatively affect the visitor experience.

RESPONSE:

The non-wilderness Cross Canyon Corridor is within a developed backcountry zone with numerous administrative buildings and facilities, electricity, running water, pump station at Indian Garden and wastewater treatment plant at Phantom Ranch. Many of these utilities and facilities produce localized noise at low levels. The new WTPs will introduce some additional localized noise that will be audible near the new infrastructure. However, the new WTPs and pump station at Phantom Ranch will be co-located with existing NPS facilities away from visitor areas (i.e. campgrounds, Phantom Ranch, water filling stations); therefore, the additional noise is not expected impact visitors.

Comment: One commenter asked that NPS not increase availability of backcountry permits in nearby use areas to accommodate closures at Indian Garden or Bright Angel Campgrounds during construction.

RESPONSE:

As stated in the EA, during closures of Indian Garden and Bright Angel Campgrounds, visitors may seek backcountry permits for areas outside of the Cross Canyon Corridor. However, the NPS is not proposing to increase availability of backcountry permits anywhere in the park in response to these closures.

Noise

Comment: Commenters requested that NPS analyze cumulative effects, including air tours, on the soundscape and stated that project helicopter flights will increase noise in the park.

RESPONSE:

At the closest point, administrative and commercial flight routes are 2.75 miles apart and the flight paths do not cross or intersect. While there is no overlap in actual routes, NPS acknowledges that there will be areas in the park where *sound* from air tours and administrative project flights will overlap. The EA acknowledged increased helicopter noise from the selected action would affect the acoustic environment over distances of up to approximately 6 miles before maximum sound levels attenuate to ambient levels. Based on the canyon topography and terrain shielding it is likely that sound from the helicopter would attenuate to ambient levels within 2 to 3 miles when below the canyon rim. Helicopter noise would likely not be noticeable to humans and wildlife beyond this distance. Based on a GIS exercise where a buffer of 3 miles was placed around each flight path, NPS found that the overlap in sound will be approximately 17,000 acres below the canyon rim (or 28,000 acres including above and below the canyon rim in the park). These changes have been documented in the Errata section of this document.

Comment: One commenter stated that direct impacts would result on the Tonto Trail because project helicopters would fly directly over the trail.

RESPONSE:

NPS acknowledges that project flights will cross over the Tonto Trail approximately 14 times with 4 in the non-wilderness Cross Canyon Corridor and 10 in proposed wilderness. Noise from the helicopter will be most prevalent directly below locations where the flight path crosses the trail. At the time of EA preparation, administrative flight paths were not known and an estimated flight path was used which resulted in incorrectly stating that there were no trails in proposed wilderness below the flight path. This change has been documented in the Errata section of this document.

Comment: One commenter asked about how the 13,000 acres impacted by helicopter flight path noise was calculated for the EA.

RESPONSE:

The 13,000 acres used in the EA, was specific to impacts on bighorn sheep from helicopters within 1,500 feet. NPS staff estimated a 35 mile total for the project flight paths, then multiplied it by 0.56 mile (a 1,500 foot buffer from the helicopter) to equal 12,544 acres (rounded to 13,000 in the EA). Again, this calculation was specific to bighorn sheep. More accurate information now available shows that the flight paths are 46 miles which will result in 16,486 acres of bighorn sheep habitat impacted. The original 13,000 acre information was inaccurately utilized in the wilderness character analysis in the EA. Using a 3 mile buffer, consistent with analysis in the EA, and the 46 mile flight path, NPS estimates that approximately 66,918 acres could be impacted by noise in wilderness below the rim from project helicopters. The rugged terrain of these acres limits human access and also provides sound buffering that lessens the distance that sound can carry; therefore, these estimates are likely much higher than what can be heard on the ground. This change has been documented in the Errata section of this document.

Comment: One commenter noted that the ambient sound level in the undeveloped South Rim area should be 17 dBA (as stated in the 2011 Overflights Draft EIS) not 29 dBA as stated in the EA.

RESPONSE:

The 2011 Overflights DEIS utilized surrogate values from other locations for natural ambient levels. This EA utilized natural ambient and residual sound levels measured in the park and from existing park reports because it is considered the best available information.

Socioeconomics

Comment: One commenter asked that the cost of construction and operation and maintenance costs be disclosed for Alternatives B and C and another commenter stated, without providing specific details or evidence, that the maintenance and operation of the water treatment plants and pump stations would cost more than the current budget.

RESPONSE:

NPS initial construction cost estimates for Alternative B and Alternative C are between \$75 million and \$120 million with Alternative C being on the higher end of these estimates. The NPS agrees that annual operation and maintenance costs of the replacement system will be higher than the current system due to the installation of a new intake and pump station at Phantom Ranch and new water treatment plants at Phantom Ranch, Indian Garden and the South Rim.

Other Comments about Impacts on Resources

Comment: One commenter stated that the EA should disclose the source of water rights for the water diversion from Bright Angel Creek.

RESPONSE:

The NPS has ensured that the park has legal authority for the selected action, including relocating the water intake.