National Park Service
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Yellowstone National Park
Yellowstone National Park, WY

Yellowstone Youth Campus Plan
Environmental Assessment

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CHAPTER 1: PURPOSE AND NEED

Introduction

Since 1978, Yellowstone National Park (YNP) has provided residential education programs for youth at the Youth Conservation Corps (YCC) campus located 1.2 miles south of Mammoth Hot Springs. Originally the campus was built for the Young Adult Conservation Corps (YACC), a work program partnership between the Department of Labor and the National Park Service (NPS).

The campus footprint is approximately 3.0 acres and consists of one multipurpose building currently referred to as the Mess Hall (classroom, office space, kitchen and dining accommodations, restrooms, storage, and a one-bed quarters unit) and two dormitories. One dormitory is used for youth residential programs and provides 60 overnight accommodations. The other dormitory is used for National Park Service employee housing and provides housing for up to 23 seasonal employees, interns, volunteers, and individuals and is considered a valuable asset for the park.

Although several interpretive centers and programs within the park serve the general visitor, the YCC campus is specifically devoted to youth education. Additional employee housing is located directly to the east of the campus and consists of apartments, trailers, modular homes, portadorms, RV's, and an 8-person dormitory. The Fleet Maintenance Garage and NPS fueling station are also located within this area (Figure 1).

Programs at the campus include: a YCC program consisting of two, month-long summer leadership and work residential programs for 15-18 year olds; Expedition Yellowstone, a 4-5 day curriculum-based residential program for grades 4-8; and Tomorrow's Stewards program. Annually these programs provide education to more than 1,900 youth in a national park setting. In addition to youth programs, the Mess Hall serves as a training and conference facility.

PROPOSAL

The NPS is proposing to reconstruct or relocate the youth campus using sustainable design to create a high quality learning center within YNP.

NEED FOR THE PROPOSAL

The proposal is needed to provide an improved and expanded youth campus that inspires life-long learning and stewardship through education programs and park experiences.

Summary of Project Objectives

Project objectives are specific goals toward fulfilling the purpose and need and must be achieved for the project to be considered a success. The following are the primary objectives of the proposed project:

- Provide a youth campus that protects park resources, encourages responsible interaction with the environment, and attains a Leadership in Energy and Environmental Design (LEED) and a Living Building Challenge (LBC) designation.

- Improve the campus facility to be a teaching model of sustainable living that interconnects stewardship in the park, at home, and throughout life.

- Improve and expand classroom space to provide students with adaptable learning environments that support the programs' curricula.

- Improve and expand dormitories, dining, and kitchen facilities to comfortably and efficiently accommodate up to 140 students overnight.

- Provide a safe and universally accessible place to learn and work

This Environmental Assessment (EA) examines the environmental impacts associated with the proposal and alternatives. This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, Council on Environmental Quality regulations for the implementation of NEPA (40 CFR § 1500-1508), DOI regulations for the implementation of NEPA, (43 CFR §46), and the NPS Director's Order (DO)-12 (Conservation Planning, Environmental Impact Analysis, and Decision-Making).

Figure 1: Existing Youth Conservation Corps (YCC) Campus

Impact Topics Retained For Further Analysis

The following topics are carried forward for further analysis in this EA:

- Soils and Vegetation
- Wildlife
- Threatened and Endangered Species
- Student Use and Experience
- Historic Structures
- Visual Resources

Impact Topics Dismissed From Further Analysis

The following impact topics are not analyzed because they do not exist in the analysis area, would not be affected by the proposal or the likelihood of impacts is not reasonably expected, or through the application of mitigation measures, there would be no measurable effects from the proposal.

Topic	Affected Environment / Reason Dismissed
Visitor Use & Experience	The campus would be for participants of education programs and would not provide visitor services for the general public. Visitors to the Upper Mammoth Terraces and Mammoth campground would likely be able to detect construction noise and activity during construction but would not be within the construction zone. Increased noise and activity would be temporary, intermittent, and during the construction season which is typically early May through end of October. Construction is not expected to cause road closures or delays and would occur during daylight hours.
Cultural Landscapes	Cultural landscapes in the park include Fort Yellowstone, the Old Faithful area, North Entrance, Stephen's Creek, Artist's Point, Apollinaris Spring, Roosevelt Lodge, and the Tower Ranger Station. No historic properties are found in the area of potential effect for direct effects. None of the actions under consideration in this EA are expected to affect the character of any cultural landscapes. Therefore, potential impacts on cultural landscapes from alternatives in this EA are not analyzed in further detail.
Wetlands & Floodplains	There are no identified wetlands or floodplains in the project areas.
Geological Resources	Yellowstone National Park is located in a geologically active area that is world-renowned for its hot springs, geyser, mudpots, and fumaroles. The project areas are not within any known faults, cracks, and geothermal features but are within a ½ mile (Alternative B) and adjacent (Alternative C) to the Mammoth Hot Springs Terraces. Geotechnical surveys occurred at both of the action alternative sites and no thermal waters or features were encountered. In the event that geological resources are encountered *Mitigation Measures* would be followed.
Indian Trust Resources	Indian trust resources would not be affected by the alternatives in this plan because there are no known resources in the project areas, and none of the 26 associated tribes raised this as a concern.

Air Quality	Yellowstone National Park is designated as a Class 1 air quality area under the Clean Air Act and extends into five counties in three states, including Park and Teton in Wyoming, Park and Gallatin in Montana, and Fremont in Idaho. None of the five counties have air pollution levels that persistently exceed the national ambient air quality standards and are designated as nonattainment status (EPA 2011). Construction related activities could result in localized, noticeable, temporary increases of vehicle exhaust, emissions, and fugitive dust. To reduce air quality impacts, idle times would be minimized by shutting equipment off when not in use or reducing idle times to no greater than ten minutes, and water trucks would spray to reduce dust where deemed necessary. There would be no long term impacts to air quality.
Soundscapes	Sounds heard from the project areas are a mix of natural and man-made including those generated from wildlife, humans, vehicular traffic, and wind. During construction, noise would temporarily disrupt the surrounding soundscape. For example, dump trucks, bulldozers, concrete mixers, drills, and backhoes all create noise while construction activities are occurring. To minimize impacts to soundscapes the contractor would limit the idling of motors except as necessary (concrete mixing trucks) and all work above 76 A-weighted decibels (dBA) would occur between daylight hours. Long-term adverse impacts to soundscapes in or surrounding the project areas would not occur.
Archeology	No archeological sites are located within the project footprint at the existing campus (Alternative B). An archaeological survey of the project area at the proposed corral site (Alternative C) for was conducted by the Office of the Wyoming State Archaeologist between September 20th and September 22nd, 2016. One cultural property was located as a result of the archaeological survey; however it is far outside of the project footprint. No National Register eligible sites were found within the project footprint, or within a reasonable buffer for construction impact. If archeological resources are encountered *Mitigation Measures* (Chapter 2) would be followed.
Paleontological Resources	There are no known paleontological resources within the project areas. Due to the nature of dormant travertine hot springs terrace below the former corral site, there is a possibility that paleontological remains would be located during grading operations. However, no paleontological remains have been recorded within the area to date. The nearest known paleontological remains are from Cretaceous marine sediments exposed on Mount Everts approximately one-mile to the east of the project areas. In the event that inadvertent discoveries of buried paleontological materials during construction *Mitigation Measures* would be followed.
Ethnographic Resources	The park's 26 associated tribes were consulted on August 20, 2014 at the same time public scoping was conducted and no tribes identified any ethnographic resources. Based on this information, the park has determined there are no ethnographic resources in the project areas or would be affected by the project.

Socioeconomics	The proposed project would neither change local and regional land use nor appreciably impact local businesses or other agencies. Implementation of the proposed project is not expected to impact the economies of nearby communities bordering the park.
Environmental Justice	There will be no disproportionate health or environmental effects on minorities or low income populations because implementation of any of the alternatives would not result in any identifiable adverse human health effects. The education campus would be available for use by all people regardless of race or income, and the construction workforces would not be hired based on race or income.
Climate Change	Like other areas across the country, both daytime and nighttime temperatures in Yellowstone are increasing beyond what can be explained by historic variability and these trends are expected to continue into the future (Chang & Hansen, 2015; Monahan & Fisichelli, 2014; Gonzalez, 2012). In addition, the snowpack is decreasing, winter isn't lasting as long as it used to, and spring is coming earlier (Tercek, Rodman, & Thoma, 2015; personal communication with A. Rodman). An earlier spring combined with a longer growing season with higher temperatures leads to moisture stress in native plants later in the summer and an increased risk of wildfires. The ability of non-native, invasive spring annuals to take advantage of the early season moisture and out-compete native vegetation is of great concern to park ecologists. In addition, early season invasive annuals, like cheatgrass, are fire tolerant and can lead to shorter fire return intervals that native plants, like sagebrush, can't tolerate (Bradley, 2009). Instances of these invasive plants spreading from disturbed areas into undisturbed areas of native vegetation have increased in the last decade (personal communication with Stefanie Wacker and Roy Renkin). The historic climate trends that have contributed to the increased spread of these non-natives are expected to continue into the future due to climate change (personal communication with Ann Rodman; USGCRP, 2014). The highly-invasive, community altering annual grasses are already present in the project area (personal communication with Stephanie Wacker). Invasive plants readily occupy disturbed areas, increase in abundance, and are prolific producers of highly viable seeds which serve as source for spread of seed into intact, native communities, which can be stressed by the rapid changes in climatic pattern (Young et al,1987; Bradley, 2009). Areas of disturbance, like the one that will be created in the project area, are especially vulnerable because they allow the non-native species to become well established adjacent to the intact native communities. Because of this added risk, invasive plant spread would be mitigated through careful monitoring and removal of invasive plant species, which encourages the growth of native species through planting. The campus would be designed to a net-positive standard producing 5% more renewable energy from photovoltaic power than it would use to operate. The only on-campus generation of carbon emissions will be from the propane used in the commercial kitchen and any propane used for emergency backup power. The estimated total annual energy use for the campus is 508,593 kWh. There would be 461 kW of Photovoltaic

	panels installed to offset this energy use and based on an energy portfolio for North Western Energy, the grid power provider, the greenhouse gas emissions offset by renewable energy are 428 mtCO2e.The project would minimize embodied carbon through energy conscious design and the use of environmentally friendly materials. The energy use intensity (EUI), for the campus buildings would range from 7.25 to 12 kWh/sq which is much lower than the average Montana or Wyoming house or office building. This energy efficient campus results from passive solar design where possible as well as an aggressive building envelope and efficient systems. The wall assemblies are designed to be R-52, the roofs R-80 and the under slab/foundation R-24 with tight construction methods minimizing air infiltration. A radiant floor for the commons with air source heat pump as the main heating source, and heat recovery ventilator improving the efficiency of managed air exchange will ensure efficient systems for heating and cooling. All appliances would be the best available technology and Energy Star compliant where applicable. All lighting would be LED, lighting spaces to only levels necessary for tasks and safety, minimizing outdoor lighting and protecting the dark night sky. All wood would be Forest Stewardship Certified or reclaimed, and the insulation materials would be 75% recycled materials. As the Yellowstone Youth Campus would include ten buildings and connecting circulation routes and utility systems it would require considerable use of heavy equipment; multiple off road excavators and loaders as well as large trucks and trailer to haul materials. All these vehicles use diesel fuel that would contribute numerous hours of greenhouse gas emissions. NPS project managers will commute only one mile and will be encouraged to use fuel efficient vehicles to visit the site, however subject matter experts will be needed from longer distances away including arriving by plane from other states. It is hoped that construction crews would be housed locally in or near Gardiner Montana which is 6 miles away. Though many of the materials would be specifically selected to have a low carbon footprint, there would still be considerable use of concrete for footings and foundations as well as rock from outside the park. To the greatest extent possible materials would be manufactured and purchased from within 500 miles to minimize haul distances and concrete would use a large percentage of fly ash to replace Portland cement, further reducing the carbon needed to manufacture it. Contract agreements would require all vehicles on site to be well maintained with no leaking of fuels or hazardous materials. Vehicles and equipment would be not permitted to unnecessarily idle while on site. The project is expected to take three years to complete and therefore the park acknowledges that the greenhouse gas emissions generated to complete it cannot be easily offset from actions within the park. The project team would complete a high-level carbon analysis once product selection is finalized and track and calculate climate change-related

	construction impacts. The project would account for the total embodied carbon (tCO2e) impact from its construction through a onetime carbon offset. The project also meets high standards for water conservation and maintaining natural water patterns on the land as much as possible. Low flow fixtures would be used throughout the campus and domestic water would be recycled through an on-site waste-water treatment system and reused for toilet flushing. Porous surfaces would be installed for campus circulation where possible and storm water would be retained on site with natural catchment and retention areas. The campus building would also serve as teaching tools, demonstrating the highest standards of sustainable design and construction. Opportunities to learn and observe natural systems and processes that contribute to minimizing carbon would be demonstrated through both design and technology.

CHAPTER 2: ALTERNATIVES

Three alternatives, no action and two action alternatives are carried forward for evaluation in this EA. Two alternatives for the education campus were considered and dismissed *(see Alternatives Considered and Dismissed)*.

Alternatives Carried Forward

Alternative A: No Action (No Campus Redevelopment or Relocation)

Alternative A provides a baseline for comparing present operations at the campus with the action alternative and anticipated environmental consequences. The No Action Alternative is defined as a continuation of present practices. Alternative A analyzes no change to existing programs, facilities, program capacity, or parking. The dormitory used for NPS seasonal employee housing would also remain as is. Currently buildings and the developed area occupy approximately 3.0 acres. Conditions described below would continue under Alternative A.

Limited Dormitory Space – The dormitory space accommodates up to 60 students but is unable to accommodate youth groups of differing sizes. The current configuration at times makes it difficult for chaperones to supervise students. A lack of privacy and housing for employees, volunteers, visiting teachers, and other necessary on-site personnel exist. Greater privacy in bathroom and sleeping areas is needed. Existing laundry facilities are inadequate in size and are in need of expansion. The carpet has been replaced several times but receives heavy use and deteriorates quickly; tables and chairs have been replaced; and bunk beds and wardrobes have been added to the dormitory to increase capacity.

Outdated Dining Hall & Kitchen – The dining hall accommodates up to 60 students/teachers in a classroom/dining setting or 100 people dining. Depending on the program and group size, up to 108 meals a day are prepared in the kitchen. The tight configuration of the dining hall makes it difficult to separate serving and seating areas, limiting the ability to use the dining hall as a classroom or conference or training space. The kitchen does not meet standard codes for a commercial kitchen. The existing equipment is in need of replacement and food storage is inadequate. During summer of 2014 the roof buckled in the corner above the dishwasher and was subsequently repaired to ensure safe facility occupancy.

Inadequate Classroom Space – The facility has one open space (the dining hall) that has been modified to serve as a classroom, with a partition taken out of one side to create a staff office. At times, lack of classroom space has forced groups to meet in the dormitory. Lack of separate classrooms prevents the ability to accommodate different groups at the same time and necessitates rearranging furniture between meal and teaching times in the same room.

Inadequate Staff Spaces – Office space is inadequate. Currently, up to 12 staff members share one office. A designated studio space equipped for live-session distance learning to access remote classrooms is not available on-site.

Inadequate Storage – A lack of storage for dry foods, gear such as snowshoes, tents, tools, and classroom props exists. Existing storage locations are scattered throughout the facility and not centrally located.

Loading Dock – The loading dock is next to one of the gear cache storage areas and poses a safety issue when students are loading gear from the dock. Drainage from the roof occurs onto the surface of the dock and often creates unsafe wet and slippery conditions. There is no railing on the dock with a 4 foot drop.

Sick/Time-out Room – The current location for this space is in the cook's quarters attached to the back of the kitchen and has one bed and bathroom. The location is a difficult spot to keep watch over the student using this space and can only be used by one student at a time.

Outdoor Learning Space – Although the programs use the park as an outdoor classroom a designated outdoor learning space on the campus itself does not exist. A dilapidated basketball court with one picnic table and an informal fire ring exists behind the mess hall.

Definition and Sense of Place – Students may not be aware they have entered the YCC campus nor do they have a sense of place when they arrive. The entry into the campus is defined by parked vehicles rather than a feeling you are at an educational facility in Yellowstone National Park.

Health & Safety – Universal accessibility is limited to non-existent at the campus. Additionally, the project needs to address safety and security issues at the campus.

Pick-up/Drop-off – The pick-up/drop-off area is inadequate as it can only accommodate one bus at a time and has restricted circulation. Often vehicles must back out, which is difficult and not a best safety practice. Students have no sheltered area to wait for vehicles or to load vehicles.

Parking – The 35 parking spaces are currently used for a variety of purposes beyond serving education program staff and participants, including government vehicles, seasonal employees living on site, and employee vehicle storage in the winter months.

Energy Efficiency & Utilities – The current buildings are not energy efficient or equipped for water conservation, and overall the buildings do not demonstrate the principles the park teaches nor represent the philosophies of the NPS related to environmental stewardship through sustainable design and practices. Additionally, the windows and doors need to be replaced as many of them have broken parts and gaps. Utilities, water, and wastewater systems are old and inadequate to sustain existing levels of use. Over time the aging facility has required increasing amounts of maintenance.

Water supply is available from the Mammoth community water system. The existing buildings utilize a loop of water mains with fire hydrants and services to the buildings. Due to the site's location near the community's water treatment plant, the water pressure is low. Flow test data have not been obtained but it is estimated that water pressure is approximately 40 psi, based on comparing treatment plant elevation to site elevation.

Montana State University Mechanical Engineering students, as part of the Design Capstone course, visited the existing site and observed several problems with the heating system of the multipurpose building. The first is the use of baseboard heaters in the classroom/dining hall space which require a large power draw. The system is operated by two HVAC handlers, one of which is not operational. Thermal scans found heat from HVAC filters leaking into the kitchen where hoods have a direct access to the outdoors. These air leaks cause the remaining operational unit to run for additional time to produce enough heat for the building. The kitchen's built-in walk-in freezer and refrigerator are directly hard-wired into the grid, are left on at all times, and have large thermal leaks.

Elements Common to Action Alternatives

Several elements are common to both action alternatives (Alternatives B and C) include:

Lighting

The NPS Night Sky Initiative and NPS Management Policies 2006 (NPS 2006) direct the NPS to "preserve to the greatest extent possible, the natural lightscapes of the parks, which are natural resources and values that exist in the absence of human-caused light. Outdoor lighting at the project areas would be designed to minimize dark areas and promote a sense of security while still allowing for clear viewing of the night sky by using LED lights and having limited and controlled directional uplighting. Incorporating this type of lighting into the proposed projects would meet the purpose and need project objectives by protecting park resources by integrating responsible design that intergrades into the surrounding environment.

Accessibility

Under both action alternatives, the campus would be designed to meet Architectural Barriers Act (ABA) requirements and meet the purpose and need of the project objectives.

Energy Conservation and Sustainability

Building orientation would maximize the site's passive solar and natural ventilation potential with simple but effective strategies. Water-efficient features, utilities, and appliances such as high efficiency showers, sinks, toilets, washing machines, refrigerators, and dishwasher would be installed. Recycled and treated graywater from showers, sinks, and laundry would be used for toilets and irrigation for vegetated roofs to reduce the use of potable water and generation of wastewater. Energy meters would be installed in buildings so energy production and use could be monitored and discussed.

Even though all the materials have not been finalized, reused, recycled, or recyclable materials would be used when deemed feasible. Many of the buildings' materials including the exposed concrete floor slabs, structural frame, corten steel, and wood structural system would not require refinishing during the life of the building, thus reducing initial costs and operational costs. Walls, roofs, and windows would be designed to maximize energy efficiency.

Net-zero energy use (meaning that the consumption of energy at the campus is no more than the energy produced by the campus in a given year) would be a goal. To accomplish this, energy use would be minimized through the use of energy-efficient features described above. The campus buildings would also serve as teaching tools and meet the purpose and need of the

project objectives by, demonstrating the highest standards of sustainable design and construction. Opportunities to learn and observe natural systems and processes that contribute to minimizing carbon would be demonstrated through both design and technology.

Under both alternatives, to meet the purpose and need of the project objectives, the campus would be designed with the goal of being both highly sustainable and durable. Project sustainability goals include Living Building Challenge Certification, LEED v4 Platinum Certification, and Passive House Certification. All of these certifications incorporate rigorous standards for green buildings that strive for net-zero energy, are free of toxic chemicals, and lower their energy footprint many times below compared to the generic commercial structure.

Temporary Offices and Contractor Housing During Construction
A temporary office facility (trailer) would be erected within the boundary footprint and use utility hook ups that are already on site of the proposed developed areas to provide a space for contractor employees to conduct business during construction. The trailer would be removed following completion of the project. Because of the lack of available housing in the adjacent community, cost of travel time to and from the work sites, and increase work efficiency the park would consider allowing contractors to use their personal trailers/RVs in the in the existing footprint of the proposed developed area during construction

Construction Schedule
The project is anticipated to be completed within three years of the start of construction. Outside construction on the exterior of the buildings would be begin in May and end in the fall or until weather permits. Interior construction and finishing of the buildings may occur year round. No road closures or traffic delays would be expected. Final construction schedule would be established when contract is awarded. Under both action alternatives, implementation is dependent on the availability of funding. The project would be largely funded by donations raised by Yellowstone Forever. Ideally the entire campus would be built in one phase. However, if more time is needed to raise money the project could be divided into two phases. Even without the second phase, the project could minimally meet the purpose and need of increasing student capacity and programs.

Construction Staging
Staging and stockpiling areas would be located within the project footprint of the proposed areas. No new areas would be developed for construction staging of materials and equipment.

Pathways
Pathways would provide formal connections between buildings and outdoor spaces and prevent user-created social trails. Pathways would generally be 4 feet wide, permeable, and constructed to be complaint with ABA standards. To accommodate emergency and service vehicle access, routes leading to the dormitories and staff apartments would be hardened to 12 feet wide. Constructing pathways that are safe and universally accessible throughout the campus would meet the purpose and need of the project objectives.

Alternative B – Yellowstone Youth Campus Redevelopment (Proposed Action)

Under Alternative B the campus would be redeveloped at the same location of the existing campus and include a new commons building, three dormitories, a classroom building, outdoor learning

space, basketball court, pathways, and parking (Figure 2 Site Plan). The new buildings would increase the capacity of students able to stay at the campus to 132, be sized appropriately to serve program needs, and present a welcoming impression for arriving participants. The redeveloped campus would provide a state-of-the-art learning facility as well as provide an example of sustainable design. The topography of the site and proximity to a wetland does not provide space for future campus adaptability and expansion. Alternative B would disturb 6.8 acres. Disturbance for the campus redevelopment would be 3.8 acres (3.0 acres permanent and 0.8 acres temporary) and 3.0 acres (2.4 acres permanent and 0.6 acres temporary from relocating the two dormitories. Permanent disturbance would occur from buildings, pathways, roads, parking areas, and other infrastructure. Temporary disturbance would occur around the areas of foundations and edges of the areas that would be permanently disturbed and from trenching of utilities.

Figure 2: Site Plan for Alternative B

The foundation and some of the structural elements of the existing Mess Hall would be re-used. Remaining material would be removed or disposed of off-site. The two existing dormitories would be relocated to three other potential locations within the Mammoth area to provide housing for seasonal employees.

Alternative B may be implemented in two separate phases as described above in Elements Common to Action Alternatives. A summary of each of the two phases is described below. Specifics of the proposed action are described in greater detail after the summary of each phase. Phase 1 would construct a commons building and two dormitories, remove the existing Mess Hall, and relocate the existing dormitories. Parking, pathways, an outdoor gathering space, and a basketball court would also be constructed. Phase 2 would construct a third dormitory and an additional classroom building.

Temporary Location for Education Programs

During redevelopment of the campus, all curriculum-based education programs that are currently offered would be moved to the Mammoth Community Center (MCC). Moving to this facility would allow for programs to maintain current full capacity with no program disruption. The MCC is located near the lower Mammoth administrative housing which is a densely developed residential area of approximately 120 acres and includes 57 ranch and bungalow-style houses (Figure 3).

Figure 3: Mammoth Community Center

The MCC is approximately 12,200 square feet and was originally constructed in 1963. For close to 45 years it served as the public school for children grades kindergarten through sixth before it closed after the 2007-2008 school year. Since then it has operated as a community center. There are 4 classrooms in the building. One classroom is used for Emergency Medical Services (EMS), one for a local preschool, one for the park's distance education learning studio, and two for meetings. The building also includes a children's library, gymnasium, small kitchen, fitness room, and restrooms. Programs currently at the MCC would be dispersed to developed facilities in Mammoth Hot Springs, Wyoming or Gardiner, Montana while the campus is under construction.

Two temporary shower buildings and a mobile kitchen unit would need to be brought in and connected to utilities; requiring approximately 200 feet of underground trenching. Temporary reversible interior alterations would be necessary to provide sleeping quarters for both male and female participants. Renovations to the outside of the building would not be needed. The building is situated on a site that has parking areas to the south and west and a maintained lawn to the north and east that includes a playground, tennis court, and softball field. The facility would be served by existing utilities including water, sewer, and electric. Vehicle access to the MCC would not change; participants would enter from the side road across from the Mammoth campground and parking spaces would remain on the west and south side of the building. For the safety of participants and residences, this access road would only be used for education program vehicles. Residential access would be limited to the south entrance to the housing area. Recycling and trash containers located adjacent to the MCC would be temporarily moved to another location in Mammoth until construction of the campus is complete and education programs are moved back to that location.

Phase 1 Components

Commons Building

The commons building would be the largest building on campus at 15,000 square feet including a great room, two (40-person) classrooms, a commercial kitchen, reception desk, gear and tool storage, office and meeting spaces, and support spaces (Figure 2 site plan #7). Interior finishes would include polished concrete floors, with exposed cross laminated timber ceiling, and exposed glu-laminated beams supported by both steel and wood columns. Walls would be finished with painted gypsum and clear pine plywood. Large view windows would be wood framed. Countertops would be made from recycled materials. Exterior of the building would consist of a durable blend of weathered steel, reclaimed wood, and triple-pane aluminum clad wood windows. The building would be oriented east-west to maximize south exposure. Openings on the north side of the building would be limited to minimize heat loss, yet adequate to provide high levels of daylight in office spaces. The east and west facades would have strategic window locations, while the south facing façade would include a significant expanse of glass providing dramatic views. The roof would have both shed- and flat- roof assemblies, with the shed roof projecting over the south façade to provide shading in the summer. A portion of the flat- roof would be a vegetated roof system.

The commons building would be universally accessible and include the following:

Dining Hall and Great Room – The great room would serve as the focal point of the commons building. It would serve up to 160 persons for dining events and up to 200 with just chairs. The

current campus dining hall accommodates up to 100 people dining. South facing glass walls and doors would provide natural light, maximize passive solar strategies, and offer views of the forest and Bunsen Peak. Mechanical high and low windows would provide natural ventilation. Internal mechanical roller shades and exterior mechanical shades or fixed louvers would be installed.

Classrooms – Two 40-person classrooms with daylight control would be located adjacent to the dining hall and great room. The existing campus does not have a formal classroom space. An area in the dining hall has been modified to serve as a classroom. Indoor space is a necessary component of educational programming, both for shelter during inclement weather and for programs that specifically require indoor space, such as multimedia presentations. Classrooms would serve as flexible spaces for teaching, meeting, and would serve varied user groups. Full height cabinets would be installed for storage space. Window treatments would be similar to those described for the dining hall and great room.

Offices and Meeting Spaces – Two private and two shared office spaces, and an open office space for up to twelve staff would be constructed. This would be an improvement from the existing campus, where up to twelve staff members share one office. The building would also include a multiuse conference room with seating up to 20 and three small meeting rooms. A designated studio space equipped for live-session distance learning would be incorporated into the office spaces.

Commercial Kitchen – A commercial kitchen would include a serving bar, a prep area for student use, a walk-in freezer and refrigerator, dry storage, laundry, dishwashing area and an office space for the kitchen manager. The current campus kitchen equipment is in need of replacement and does not meet standard codes for a commercial kitchen.

Gear and Tool Storage/Loading – Storage areas would provide adequate space to store materials, props, gear and tools used for programs. The loading area would be conveniently located at the entrance and capable of accommodating two buses at a time for picking up/dropping off students, loading gear, or receiving deliveries. The current campus has a loading area that is a safety issue when students are loading gear from the dock and storage space is inadequate for gear and tools needed for education programs.

Restrooms – Restroom facilities would be compliant with the ABA and use recycled materials for partitions and countertops. The current campus is not compliant with ABA and only allows for minimal privacy.

Outdoor Spaces – An outdoor plaza with terraced and outdoor seating, a fire pit, and a basketball/volleyball court (Figure 2 site plan #) would provide spaces for teaching and an outdoor gathering area for free-time activities. The outdoor learning space would be sited at the southwest edge of the commons building to take full advantage of views of Mount Everts and Bunsen Peak. Stone seatwalls with a series of stone terrace walls would extend south outbound from the southern façade of the kitchen. The current campus does not have a designated outdoor learning space. The fire ring area (~30 feet diameter) would have cut log benches to accommodate up to 60 people. The sports court (~42-feet by 72-feet) would have two basketball hoops and embedded sleeves for volleyball. The current campus has a dilapidated basketball court and an informal fire ring.

Access Road, Parking, Pick-up/Drop off – The access road into the campus would remain as the central arrival area. Car and bus parking would be provided along this road with accessible parking spaces and a large radius turn-around in front of the commons building. Students could be dropped off at the front entrance of the campus. At the current campus students have to walk with their luggage across the parking area that includes parking for government employees and seasonal employees living on site. Parking would continue to accommodate 35 vehicles. The area would have a permeable surface to maximize infiltration and natural filtration. This configuration also allows for easier access for gear loading and deliveries.

Dormitories & Staff Apartments

During phase 1, two residential buildings would be constructed southeast of the commons building (Figure 2). The buildings would be approximately 8,000 square feet in size and 40 feet apart. Each dormitory would have six student rooms with six beds each and four adult chaperone rooms with two beds each to sleep up to 44 people. Buildings would meet the purpose and need of the project objectives by providing flexibility which currently does not exist at the current campus for group sizes and separation. The layout of the dormitories would also allow for a sick or time-out space if needed. Additional space would include a common room, two single-occupant accessible full bathrooms, two shared bathrooms, kitchenette, mudroom, laundry, storage, IT closet, and janitorial space.

Two apartments, one two-bedroom and one studio for staff, would occupy the lower, walk-out basement level. The exteriors are primarily clad in a board and batten system of reclaimed wood. Having staff living on site would provide a NPS presence and assistance should any safety or security concerns arise.

Exterior windows would be "grouped" with the infill material as charred reclaimed wood. The lower level of the building would be clad in weathered steel panels which creates a durable base. Roofs would be standing seam weathered metal and designed to accommodate full solar photovoltaic array panels. Each building would have panels that consist of a 131 kw photovoltaic array. These panels would have the capability of producing enough power for the campus.

Utilities

Water – The water supply is available from the Mammoth community water system. The new site layout and grading would require most of the existing water mains to be replaced. The schematic design proposes a water main running through the site from an existing eight-inch water main in the south all the way to the site access from the YCC Camp Road. With this change the total water main would be approximately 1,300 feet. The new water main would be an eight-inch ductile iron pipe with three new fire hydrants spaced throughout the site. Separate water services would be provided to each of the buildings for domestic use and fire sprinklers. Due to relatively low pressures at the current campus, supply piping may need to be slightly oversized to minimize pressure loss.

Sewer – A portion of the existing six-inch sewer lines would be maintained to serve the new buildings. This main would be truncated in the site with a new terminal manhole and new sewer services provided to each building. Sewer piping would either be ABS plastic or cast iron.

Storm Drainage–Storm water runoff would be captured on-site, treated, and infiltrated into the soil. Storm water mitigation would be designed based on the 10-year rainfall event. Bio-retention basins would be used to treat storm water, provide short-term storage of storm runoff, and allow infiltration into the soil. The site pavement would be sloped directly to catchment areas. One side of the access road would utilize curb and gutter to direct storm runoff. Pathways would use permeable pavers with an aggregate base to decrease site runoff. The commons building and classroom would have flat roofs with interior storm water collection piping. These pipes would be routed below ground to the storm water drainage system. Overflow gutters on the buildings would provide backup flow paths. Additional area drain catch basins have been added to the site to capture storm runoff from the courtyard and dormitory roofs. Storm water from these inlets would be collected in pipes and routed to a bio-retention basin. Foundation drains would be provided along all perimeter building foundations and critical interior foundations. Approximately 2,750 feet of foundation drains would be exposed. These drains would provide protection against water infiltration into the buildings or excess groundwater weakening soil beneath foundations. The current campus does not have a storm drainage system that incorporates bio-retention basin or provides protection against water infiltrating into or weakening the building foundations.

Site Grading–Site grading would provide a large central yard essentially at the same elevation as the principal building floors. This would require a fair amount of regrading of the site with the western portion cut into the base of the hillside and the eastern portion filled above the existing ground. Cut and fill slopes would be no steeper than 3:1 (horizontal: vertical) unless retainage is provided.

Dormitory Relocation

To help meet park operational needs and provide additional affordable housing options, the NPS would relocate and convert the two existing dormitories to employee housing. The parks maintenance staff and contractors would relocate the dormitories. Approximate cost for relocation of the two dormitories would be $3-5 million.

Sites considered for dormitory relocation are described below:

Lower Mammoth Housing (Site 1)

This site is located approximately 0.5 mile from park headquarters and is within the lower Mammoth Housing area (Figure 4). Existing structures includes 57 ranch and bungalow-style houses constructed between 1938 and 1966. Approximate disturbance at Site 1 would be 1.3 acres (1.0 acres permanent and 0.3 acres temporary). Permanent disturbance would occur from the building and parking. Temporary disturbance would be from utilities and grading.

YACC Camp (Site 2)

This site is located adjacent to the YACC Camp housing area (Figure 5). Approximate disturbance at Site 2 would be 1.5 acres (1.2 acres permanent and 0.3 acres temporary). Permanent disturbance would occur from the building, parking, and path area. Temporary disturbance would be from utilities and grading.

YACC Camp (Site 3)

This site is within the footprint of the YACC Camp housing area (Figure 6). Approximate disturbance at Site 3 would be 1.5 acres (1.2 acres permanent and 0.3 acres temporary). Permanent disturbance

Figure 4: Dormitory Relocation (Site 1)

would occur from the building, parking, and path area. Temporary disturbance would be from utilities and grading.

Phase Two Components

Third Dormitory & Staff Apartments
This building would be identical to the housing described in Phase I (Figure 2) Site Plan Constructing a third dormitory would increase the number of students who could participate in youth programs and stay overnight on campus to a total of 132 students and chaperones. The additional staff apartments would provide a NPS presence and assistance should any safety or security concerns arise. Providing staff apartments would also help with the lack of available employee housing.

Classroom Building
This building would be 3,500 square feet (Figure 2). Space within the building would include two 40-person classrooms; two distance learning studios, restrooms, a general storage space that could also serve as an open office space, support spaces for information technology, and janitorial supplies. The additional classroom building would provide the ability to accommodate different groups at the same time and provide indoor space in the event of inclement weather. The building would be closely related to the commons building in both character and construction. Primary window

Figure 5: Dormitory Relocation (Site 2)

Figure 6: Dormitory Relocation (Site 3)

location would be west and east facing. To limit undesired glare and heat gain windows would be placed into smaller sections of vertical glazing to create a high level of daylight and transparency while allowing for exterior shading. The classroom building would utilize the same flat roof assembly as the commons building but without the vegetated roof.

Alternative C – Yellowstone Youth Campus Relocation (Preferred Alternative)
Alternative C would construct a campus at a relatively undeveloped site located south of Mammoth Hot Springs. A portion of this site which is approximately 2.0 acres was the former location of the Mammoth corrals, where Xanterra Parks & Resorts historically offered guided interpretive horseback rides during the summer. In 2014, the Superintendent determined that livery in the Mammoth area should be an authorized not required service. In 2016, after additional review, the Superintendent determined that the corral operation was not a necessary service. The Mammoth livery and corral area have been removed from the Xanterra contract. The barn, corrals, two cabins, and vault toilet are the only existing structures. Buffalo Jone's historic building foundation is located at the southern end of the site and is discussed in the Historic Resources section. This site is located on the east side of the Grand Loop Road. It is also near the old Fort Yellowstone Cemetery and site of the former Mammoth Lodge. The remaining barn and structures associated with the Mammoth corral operations would be removed. The new buildings would increase the capacity to 140 students able to stay at the campus. The topography of this site provides space for future adaptability and expansion of education programs unlike the current campus and Alternative B where topography and proximity to a wetland limits future expansion.

Similar to Alternative B, the project would be implemented in two separate phases if necessary to allow for funding. A summary of each of the two phases is described below. Specifics of the proposed action are described in greater detail after the summary of each phase. The first phase would construct a commons building, three dormitories, one staff apartment, and the gear storage and waste-water treatment building. In addition parking, pathways, and an outdoor space would be included. Phase two would construct two more dormitories, one additional staff apartment building, an additional classroom building, and a fire pit and basketball court. Total area of new disturbance for Alternative C would be approximately 17.0 acres (6.0 acres permanent and 11.0 acres temporary). Permanent disturbance would occur from buildings, pathways, roads, parking areas, and other infrastructure. Temporary disturbance would occur around the areas of foundations and edges of the areas that would be permanently disturbed and from trenching of utilities (Figure 7). This site provides space for future adaptability and expansion of education programs.

Buildings at the existing YCC campus would remain as is. The two dormitories would be used for employee housing. The Mess Hall would be taken offline until energy efficiency could be improved to use the building as additional office or conference room space. Energy efficiency and utility deficiencies at the existing campus described under Purpose and Need would continue.

Phase 1 Components

Commons Building

The proposed commons building would be similar to the one described for Alternative B. The differences would be that this building would be 14,889 square feet, the main point of entry would be from the east side, configuration of inside spaces, roof assemblies would have both shed-and vegetated low-slope, and the gear storage space would be a separate building. The building would be situated on a level area and have a concrete slab-on-grade. Solar panels would consist of a 248.4 kw photovoltaic array.

Dormitories

Three student residential buildings would be constructed on the south and east side of the site and downhill from the commons and classroom building. The buildings would be approximately 4,500 square feet in size. Each dormitory would have four student rooms with six beds each and two adult chaperone rooms with two beds each to sleep up to 28 people. Buildings would provide flexibility for group sizes and gender separation. To accommodate the sloped site, the buildings would have crawl spaces with continuous concrete wall foundations covered by gabion walls on the exposed downhill portion. Additional spaces would be similar to those described in Alternative B with the exception of staff apartments on the lower level. Each building would have solar panels that consist of a 56 kw photovoltaic array.

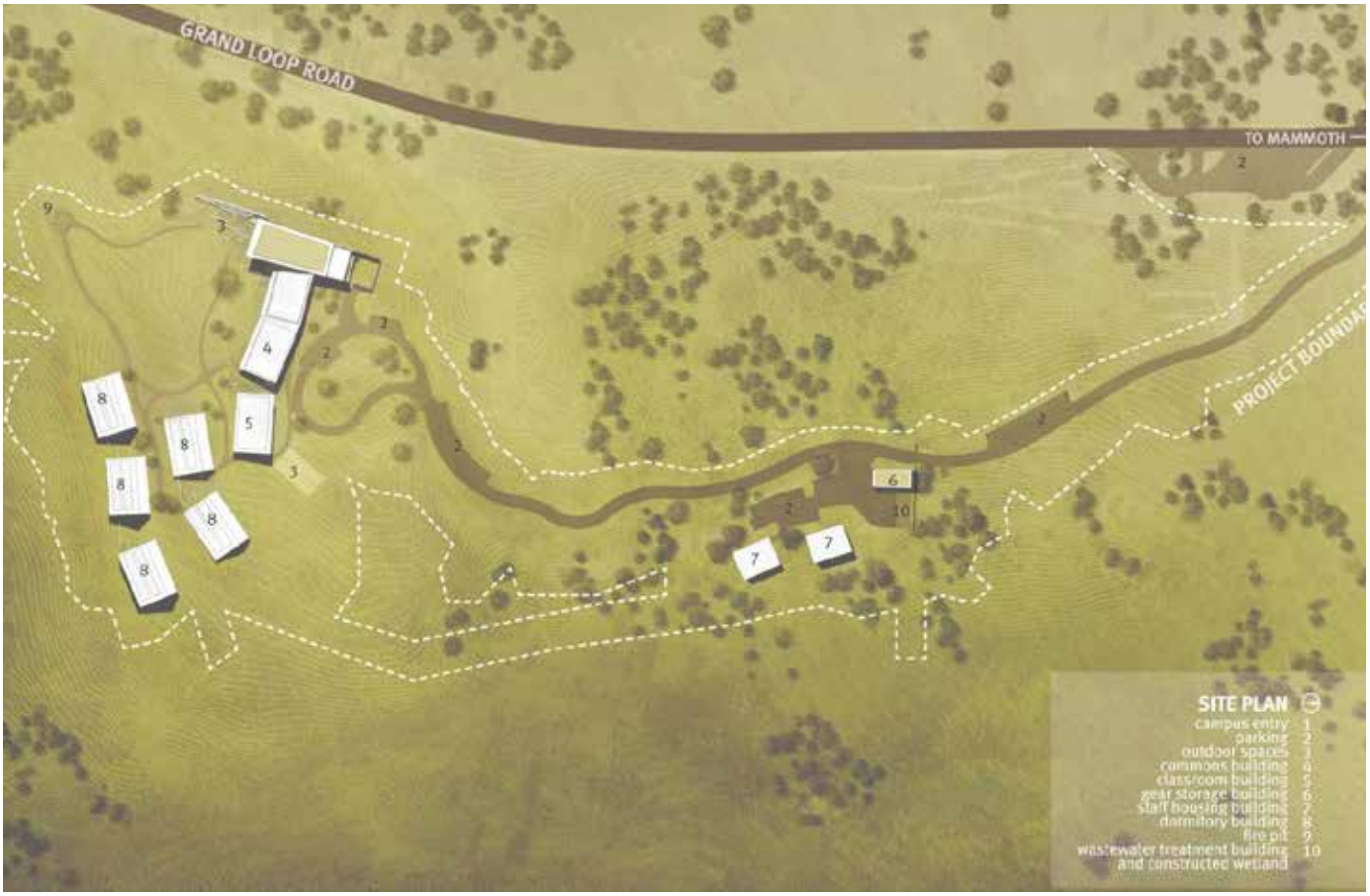

Figure 7: Site Plan for Alternative C

Staff Apartments
A one, two-story building would provide year-round housing for staff. The building would be 3,015 square feet and have up a six unit configuration that includes an efficiency, a one-bedroom, and two two-bedroom apartment. Staff housing would be separate from the dormitories unlike Alternative B and located on the north end of the campus. Staff housing would provide an NPS presence and point of contact in case of an emergency but provide for separation between students and employees.

Gear Storage and Wastewater Treatment Building and Constructed Wetland
The gear storage building would be 1,600 square feet with two large storage rooms, main campus IT room, one restroom, and a wastewater treatment room. The building structure, wall, and roof assemblies would be similar to the commons buildings. The building's long edge would be located north-south with a low-slope vegetated roof similar to the west portion of the commons building. All wastewater from the campus would gravity flow to an underground tank below the treatment facility and be pumped up to an underground holding tank west of the building. From there wastewater would flow into bio-filter chambers located in ground to the east of the building. From the filters, gray water would be pumped through a constructed wetland approximately 400 square feet to the east of the filters for further polishing, before being pumped to the mechanical room of the treatment facility for chlorination and then into a volume "day-use" buffering tank before being pumped back to all buildings for toilet flushing. The filter yard and constructed wetland would be fenced to prevent wildlife from accessing the area and to protect equipment. The fence would allow a view to the system as a teaching tool to explain water conservation on the site. Excess gray water not needed for toilets would flow to the on-site drain field. The entire system would be connected to the main sanitary sewer below the site for emergency redundancy and overflow protection.

Access Road and Parking – The access road (20 feet) into the campus would be shifted to the north end of the existing bus parking for the Mammoth Terraces at the Grand Loop Road and then follow the existing road alignment to the gear storage and staff apartments located in the area of the current barn. From that point south a new entry drive would be configured to follow existing grading, culminating in a one way turnaround loop (15 feet wide) at the north side of the commons building. Passengers would exit at the bus-drop off areas (10 feet wide) against a flush curb separating the vehicle and pedestrian zones. A side drive would run west from the turnaround for service vehicles. Parking would occur along the west side of the entry drive. There would be 58 total parking spaces, including two ABA. Parking for four buses would be provided at the north portion near the gear storage building.

Utilities

Water – Water supply is available from the Mammoth community water system running along the Grand Loop Road adjacent to the site. This line is supplied by the Mammoth water treatment facility to the south of the site and continues to the tank just outside the developed area Mammoth. A new eight-inch ductile iron water main would be proposed to connect the existing water main. Total length of the water main would be approximately 2,850 feet and six fire hydrants would be spaced throughout the site. Separate water services would be provided to each of the buildings for domestic use and fire sprinklers.

Sewer – A collection line for the Gardiner-Mammoth community wastewater treatment system runs through the site. Approximately 560 feet of existing line would need to be rerouted to avoid buildings and 1,650 feet of gravity sewer, 430 feet of forcemain, and 750 feet of sewer services. All new gravity sewers would either be ductile.

Storm Drainage – Storm water runoff would be captured on-site, treated, and infiltrated into the soil. Storm water mitigation would be based on the 10-year rainfall event. Bio-retention basins would be used to treat storm water, provide short-term storage of storm runoff, and allow infiltration into the soil. Storm water would be conveyed to areas with swales, ditches, and culverts. Pathways would use permeable pavers with an aggregate base to decrease site runoff. Foundation drains would be provided along all perimeter building foundations and critical interior foundations. Approximately 3,500 feet of foundation drains would be exposed. These drains would provide protection against water infiltration into the buildings or excess groundwater weakening soil beneath foundations.

Site Grading – To be complaint with NPS accessibility standards between buildings and site elements on the campus, site grading would need to occur at much of the project area. Buildings would be placed on and parallel to grade and step down the slope from the commons building. Cut and fill slopes would be no steeper than 3:1 (horizontal: vertical) unless retainage is provided. Cut and fill on-site would be balanced to avoid the need for trucking material to or from the site.

Construction Staging – Staging and stockpiling areas would be located in previously disturbed sites within the project footprint. Parking for construction equipment and vehicles would be limited to staging areas, the existing roadway, parking area, and other previously disturbed areas. No new areas would be developed for construction staging of materials and equipment.

Phase Two Components

Dormitories

Two additional student residential buildings, identical to those described in phase one, would be constructed on the south and east side of the site. These two dormitories would increase the number of students who could participate in youth programs and stay overnight on campus to a total of 140 students.

Staff Apartments

Another two-story staff apartment building similar to phase one would be constructed. However, due to funding constraints, a four unit configuration that includes a one-bedroom, and a two-bedroom apartment would be selected.

Classroom Building

This building would be 3,700 square feet and located east and at the same elevation of the commons building and would be closely related in both character and construction. The combined effect of these elements would provide a formal sense of arrival to the campus and provide an entry not only into the two buildings but into the campus setting. Space within the building would include two 40-person classrooms; two distance learning studios, restrooms, a general storage space, support spaces for information technology, and janitorial supplies. Primary window location would

be south facing. The classroom building would utilize the same shed roof assembly as the commons building.

Outdoor Spaces

An outdoor plaza with terraced and outdoor seating, a fire pit, and a basketball/volleyball court would provide spaces for teaching and an outdoor gathering area for free-time activities. The teaching space would be sited at the southern edge of the commons building to take full advantage of views of Mount Everts and Bunsen Peak. Stone seatwalls with a series of stone terrace walls would extend south outbound from the southern façade of the kitchen. The fire ring area (~30 feet diameter) would have cut log benches to accommodate up to 60 people. The sports court 1800 square feet) would have two basketball hoops and embedded sleeves for volleyball.

Mitigation Measures

The following mitigation measures would be implemented under Alternatives B and C to minimize the degree and/or severity of adverse effects and are discussed further in Chapter 3.

General Construction Best Management Practices

- Ground disturbance, staging and stockpiling areas would be located in parking areas, or in previously disturbed sites within the project footprint, away from core visitor use and residential areas to the greatest extent possible. All staging and stockpiling areas would be returned to pre-construction conditions following construction.

- Construction zones would be identified and fenced with construction tape, snow fencing, or some similar material prior to any construction activity. Fencing would define the construction zone and confine activity to the minimum area required for construction. All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the construction zone as defined by the construction zone fencing.

- The NPS project manager would be responsible for ensuring the project remains within the construction limits.

- Fugitive dust generated by construction would be controlled by spraying water on the construction site if necessary. Any water used for dust control would be taken from hydrants in park administrative areas, or a local source approved by the park.

- To minimize possible petrochemical leaks from construction equipment, the contractor would regularly monitor and check construction equipment to identify and repair any leaks.

- Fuel would be stored in fuel trucks or aboveground storage tanks, and all fuel storage would be in staging areas.

- Tools, equipment, barricades, signs, demolition debris, and rubbish would be removed from the project work limits upon project completion.

Soils

- Topsoil conservation measures would be employed prior to construction in accordance with Yellowstone Vegetation Management for Construction Disturbance Guidelines (YNP 1997). Topsoil would be stripped and replaced wherever possible to enhance revegetation following the construction phase.

- Disturbed soils are more susceptible to erosion and until revegetation takes place, standard erosion control measures such as silt fences and/or sandbags would be used to minimize any potential soil erosion.

Vegetation

- A revegetation plan would be written and implemented to minimize impacts to native from Alternatives B and C.

- Disturbance to existing vegetation at the sites would be avoided to the greatest extent possible. During construction, a temporary construction limit fence would be placed at the project footprint to protect native vegetation.

- After construction, the site would be revegetated by transplanting native vegetation between Mammoth Campground/North Entrance Road and relocated dormitory site in lower Mammoth and reseeding within the project area (Alternative B).

- After construction, the site would be revegetated by transplanting native vegetation between Fort Yellowstone Cemetery and the proposed staff housing area and reseeding within the project area (Alternative C).

- Vehicles, equipment, and staging for materials would occur within the project footprint.

- Equipment used would be cleaned to reduce the spread of non-native plant species.

Wildlife

- To avoid impacts to migratory birds during nesting season, all tree, shrub, and grass removal activities must not occur between March 1-August 15th for raptors, and May 1- August 1st for songbirds. If tree, shrub, and grass removal would occur within the specified dates, the Bird Program Manager (307) 344-2242 would need to be contacted to discuss or schedule a survey of the project site.

- All outdoor food storage would adhere to park policies already in place to ensure no unattended food sources are available to wildlife.

- All contractors and employees would be given orientation and educated about working in grizzly bear country and briefed on proper food storage and safety measures. Orientation would include information about park regulations regarding food storage, disposal of garbage and other bear attractants, safety measures, and approaching or harassing wildlife.

- All contractors and employees would be informed about threatened and endangered status species. Contract provisions would require the cessation of construction activities if a species

were discovered in the project area, until park staff re-evaluates. This would allow modification of the contract for any protection measures determined necessary to protect the discovery.

Soundscapes and Air Quality

- To reduce noise and emissions, construction equipment would not be permitted to idle for more than 10 minutes while not in use according to the Superintendent's Compendium, based on CFR 36 § - 5.13 Nuisances.

- Appropriate dust mitigation suppression controls, such as spraying water at the construction site and covering loaded trucks would be implemented.

Archeological Resources

- Should construction unearth previously undiscovered cultural materials (glass, ceramic, bone, metal cans, obsidian, etc.) during work in the area, crews must stop work immediately and contact the park archeologist at (307) 344-2290 for assistance. In the unlikely event that human remains are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) and NPS Director's Order 28 would be followed.

- The NPS would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting artifacts or intentionally damaging archeological sites or historic properties. Contractors and subcontractors would also be instructed on procedures to follow incase previously unknown archeological resources are uncovered during construction.

Paleontological Resources

- In the event that inadvertent discoveries of buried paleontological materials were made during construction the contractors would stop work and contact Cultural Resources at (307) 344-2290 for assessment of finds before continuing work.

Geological Resources

- If any of the following conditions are encountered, stop work and immediately contact the park geologist: A pre-existing hole in the ground the size of a basketball, or larger, standing or flowing water, either hot or cold, or a "rotten egg', smell.

Visual Quality

- Weathered corten steel and natural wood siding would be used on much of the exterior buildings to blend in with the brown and red rich tones and textures of the nearby Mammoth Hot Spring Terraces. Natural stone would be used along some of the building foundations and for landscaping. Material that is reflective would not be used.

- A vegetated roof would be installed on the commons building in Alternative B and Alternative C. In Alternative C, the vegetated roof would be visible from the Grand Loop Road and High Bridge. The vegetated roof would and assist the building to merge with the surrounding landscape.

- Existing vegetation and natural topography would be preserved and revegetation efforts would be done to screen new infrastructure as much as possible.

Alternatives Considered and Dismissed

The following alternatives were considered for project implementation, but ultimately dismissed from further analysis. The reasoning for dismissal is provided in the following alternatives description.

- ***Renovation of Existing Structures –*** This alternative would include a complete renovation of the existing buildings to improve deficiencies at the YCC campus. This alternative is not being pursued because of costs and the inefficiency of the existing buildings at the YCC campus, as well as the feasibility of trying to make the site and facilities meet the purpose and need of the project.

- ***Relocate the Education Campus outside the Park –*** Relocation of the education campus to a site in the Gardiner, Montana area just outside of the north entrance of the park was evaluated. The site had several appealing features but had issues related to access, water, security, and overriding factors such as distance from the park and added transportation time and expense to conduct outdoor lessons in the park, as well as the high quality of experience students receive from living and learning in the park during program participation and would not meet the purpose and need of the project.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment (existing setting or baseline conditions) and analyzes the potential environmental consequences (impacts or effects) that would occur as a result of implementing the alternatives.

Cumulative Impact Scenario

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

Cumulative impacts are considered for both the no action and action alternatives. Cumulative impacts were determined by combining the impacts of each alternative with other past, present, and reasonably foreseeable future actions. Therefore, it is necessary to identify other past, ongoing or reasonably foreseeable future projects that may impact each resource topic. Given this, the following projects were identified for the purpose of conducting the cumulative effects analysis, listed from past to future:

- Park-wide Road Improvement Plan (1992)
- Mammoth Public Restroom Plan (2000)
- Mammoth Housing Plan (2003)
- Yellowstone Justice Center Plan (2004)
- Tower-Roosevelt Comprehensive Plan (2010)
- Lake Comprehensive Plan (2012)
- Invasive Vegetation Management Plan (2013)
- Hazard Fuel Reduction in Developed Areas (2014)
- Trail Maintenance Projects (ongoing)
- Long Range Interpretive Plan (ongoing)
- Mammoth Hotel Repositioning & Mammoth Cabin Renovation (in progress)
- Haynes Administrative Building Utility Installation & Parking (in progress)
- National Ecological Observatory Network (in progress)

Soils & Vegetation

Affected Environment

Soils at the proposed sites developed upon glacial till with sandy loam or loam textures. The soils have an argillic horizon, which is a layer of soil where clay has accumulated and consist mainly of alluvium from the Pinedale Glaciation with a trace of landslide debris. The alluvium is an unsorted, non-stratified, compact mixture of round stones, sand, silt, and clay. Additionally, an intrusive formation related to the Gallatin Intrusion is present along the crest of a morainal ridge in the YCC Camp area. A large portion of the soils at the proposed project areas have been previously disturbed and altered from past construction of buildings, parking, pathways, and other structures.

Soils at dormitory relocation Sites 2 & 3 are similar to those described above at the campus. Soils at Site 1 and the MCC are primarily kame deposits, with localized areas of travertine deposited by the geothermal hot springs. These deposits have potential to develop caverns and sinkholes when groundwater dissolves travertine. Although sinkholes have not been observed in the areas proposed for the relocated dormitories, caverns may be present beneath the ground surface. A geotechnical survey of the sites would be performed before dormitory placement. If travertine soils and/or caverns or sinkholes were identified from the survey the dormitories would not be placed in these locations and other locations chosen.

On August 24, 2015 a geotechnical survey was conducted at the existing campus. The purpose of the geotechnical survey was to assist with design of the foundations, slabs, pavements, and prepare plans and specifications for the project. In general, the soil profile across the site consisted of a layer of sandy clay. Groundwater was encountered in 10 of the 16 soil borings at depths of 7 to 28 feet.

On July 20, 2016 a geotechnical survey was conducted at the former Mammoth Corral Site for the same purpose as the one conducted at the existing campus. In general, the soil profile across the site consisted of glacial till with alternating layers of clayey gravel with sand and poorly graded gravel with clay. Groundwater was encountered in 4 of the 14 soil borings at depths ranging from 9 to 22 feet.

Native vegetation within the proposed project sites are predominated by two vegetation types. One is on soil that is rocky and not as developed with shrubs. Species associated with this vegetation type include stemless mock goldenweed), littleleaf pussytoes, prairie junegrass, bluebunch wheatgrass, fringed sagebrush, Sandberg bluegrass, and buckwheat. The other vegetation type is on more developed soils and includes sagebrush, rabbitbrush, Great Basin wildrye, prairie smoke, and yarrow. Individual and isolated stands of Douglas-fir, engelman spruce, limber pine, common juniper and aspen occur.

Non-native species include cheatgrass, henbane, sweet clover, Berteroa, salsify, timothy, spotted knapweed, Canada thistle, Mullein, tumble mustard, tansy mustard, medicago, Kentucky bluegrass, oxeye daisy, smooth brome, dalmation toadflax, common dandelion, and houndstongue. No special status plant species or wetlands occur within the project sites.

Impacts of Alternative A -No Action
No disturbance to soil or vegetation would occur because Alternative A does not include any construction related activities, excavation, or ground disturbance.

Cumulative Effects: There would be no impacts to soils and vegetation under Alternative A; therefore, this alternative would not contribute to cumulative impacts of other projects in this region.

Impacts of Alternative B (Yellowstone Youth Campus Redevelopment) – Proposed Action
Under Alternative B, construction activities would remove and clear soils and vegetation. These actions would adversely impact approximately 6.8 acres of soils and vegetation from grading,

excavating, trenching, building, and utility line installation. New disturbance for the campus redevelopment would be 3.8 acres (3.0 acres of permanent and 0.8 acres temporary soil and vegetation removal and clearing). Relocating the two dormitories to two of the three sites identified would disturb approximately 3.0 acres (2.4 acres of permanent and 0.6 acres temporary soil and vegetation removal and clearing). Vehicles, equipment, and staging for materials would occur within the project footprint. Both the soils and vegetation present at the project sites for Alternative B are common in the Mammoth Hot Springs area and throughout the park thousands of acres of the same soil and vegetation type would remain undisturbed.

The MCC is located in a previously disturbed area with an existing building with a maintained lawn, access road, and parking. No new disturbance to soil and vegetation would occur at this location.

Disturbance would occur in common upland vegetation (sagebrush, grasses, forbs) and areas that are dominated by non-native weed species from the footprint for buildings, parking areas, entrance road, pathways, and outdoor spaces. Along the west slope of the campus, up to eight coniferous trees (Douglas-fir, spruce, limber and juniper) would be removed to accommodate the commons building. Approximately, 46 trees would be salvaged and retained for replanting at the site following construction. Depending on the selection of sites for the dormitory relocations, up to 20 trees (Douglas-fir, spruce, limber, and juniper) would be removed to accommodate the buildings, parking areas and pathways, and utility lines.

Utility placement and areas around infrastructure may cause temporary impacts to soil and vegetation, up to three years for herbaceous species (grasses and forbs), and more than ten years for shrubs (sagebrush, rabbitbrush) if revegetation efforts, soil compaction, and erosion control measures are successful. During construction, ground clearing activities would take place which could allow exposed soils to erode. Potential for soil erosion is greatest during construction, when removal of vegetation for initial clearing and grading activities exposes soil and makes it more susceptible to erosion. Soil compaction due to construction activities may also occur and would reduce aeration, permeability, and water-holding capacity of the soils and cause an increase in surface runoff, potentially causing increased erosion. Impacts to soils would be minimized by appropriate erosion control measures and prompt re-establishment of vegetation.

Due to the prevalence of weed species at the current campus this site would be highly susceptible to establishment of non-native plant species. To avoid transporting in new non-native plant species, equipment would be cleaned before entering the park and/ or construction site. Soils and vegetation have been disturbed from construction of the campus, the YACC Camp, and Mammoth housing area. Non-native weed species that germinated from the seed bank continue to dominate, despite several years of weed control measures. To restore the site, a revegetation plan would be developed by the parks vegetation specialists prior to beginning construction and ground-disturbing activities. To attempt to enhance revegetation following the construction phase, topsoil conservation measures would be followed as specified in the Yellowstone Vegetation Management for Construction Disturbance Guidelines (YNP 1997).

Cumulative Effects: Roadway improvement projects, facility and visitor service improvement projects, vegetation management activities (fuel reduction defensible space, roadside mowing, non-native weed control), and infrastructure and utility development have in the past and would continue

from future projects that involve land clearing and disturbance that could result in soil compaction, erosion, and vegetation loss due to effects that are primarily localized and specific to the respective project areas. Non-native species could be introduced to project areas. Revegetation efforts have minimized the adverse effects of ground disturbing activities. Collectively, ground disturbing actions have had and would continue to have adverse cumulative impacts on soils and vegetation in the park. When the 5.4 acres of permanent impacts under Alternative B are combined with these other impacts, the total cumulative impact on soils and vegetation would continue to be adverse. Overall, the impacts under Alternative B would contribute slightly to, but would not substantially change, these ongoing cumulative effects.

Impacts of Alternative C (Yellowstone Youth Campus Relocation) – Preferred Alternative

Alternative C would result in up to 17.0 acres (6.0 acres permanent and 11.0 acres temporary) of soil and vegetation removal and clearing. These actions would cause adverse impacts to soil and vegetation in the project area from grading, excavating, trenching, building, and utility line installation. 6.0 acres of common upland vegetation (sagebrush, grasses, forbs) and soil would be removed for buildings, parking areas, entrance road, pathways, and outdoor spaces. Within the project footprint, approximately 18 coniferous trees (Douglas-fir, spruce, and juniper) would be removed to buildings, access routes, and parking areas. Vehicles, equipment, and staging for materials would occur within the project footprint.

Soil and vegetation removal and clearing for utility line placement and grading would temporarily disturb 11.0 acres of soil and vegetation out of the 17.0 acres footprint of the project. As stated above 6.0 acres of permanent soil and vegetation removal would occur for the project. . Soil disturbance would physically alter soils and make them more susceptible to soil erosion, compaction, and loss of productivity. Within the project footprint, past disturbances to soil and vegetation occurred from the Buffalo Jones cabin, the former corral operations, and utility lines but have not been disturbed for some time. Overall the site is a fairly intact sagebrush plant community with an understory of natives and non-native species. Topsoil conservation measures would be followed in accordance with Yellowstone Vegetation Management for Construction Disturbance Guidelines (YNP 1997).

Of concern is the presence of cheatgrass and desert alyssum which has spread through much of the Gardiner Basin area and is starting to spread to other areas of the park. These two species are difficult to control, degrade native plant communities, and decrease wildlife habitat (Wacker pers. comm). To keep this site similar to its present conditions an integrated revegetation plan would be developed by the parks vegetation specialists prior to beginning construction and ground-disturbing activities. To avoid transporting in new non-native plant species, equipment would be cleaned before entering the park and/ or construction site. Similar to Alternative B, even with permanent removal and clearing of 6.0 acres of soil and vegetation and temporary removal and clearing of 11.0 acres, both the soils and vegetation are common in the Mammoth Hot Springs area and throughout the park thousands of acres of the same soil and vegetation type would remain undisturbed. The unknown is from climate models based on data collected in Yellowstone that indicate future warmer and drier conditions in the future which would likely make revegetation more challenging (Wacker pers. comm).

Cumulative Effects: Cumulative effects to soil and vegetation are the same as under Alternative B except Alternative C would result in 17.0 acres of additional impacts. Collectively, these actions have had and would continue to have adverse cumulative impacts on soils and vegetation in the park. When the 6.0 acres of permanent impacts under Alternative C are combined with these other impacts, the total cumulative impact on soils and vegetation would continue to be adverse. Overall, the impacts under Alternative C would contribute slightly to, but would not substantially change, these ongoing cumulative effects.

Wildlife

Affected Environment

The current education campus and proposed education campus sites are located within Mammoth Hot Springs. The most common mammals living in and around the current campus and proposed sites include: Small mammals such as pocket gophers, mice, voles, marmots, chipmunks, Uinta ground squirrels, weasels, and red squirrels. Badgers are occasionally observed in the proposed project areas as they are typically observed in areas with large populations of ground squirrels.

The northern Yellowstone elk herd is one of the largest free-ranging herds in North America. During most of the year, elk are commonly observed browsing on lawns in Mammoth Hot Springs and elk are frequently observed in the vicinity of the existing campus, proposed for Alternative B. Elk have been observed calving and seeking cover from predators in the sagebrush and grassland in the meadow below the area for the campus under Alternative C. Several areas around proposed project areas and provide ample protection for the elk during and shortly after the spring calving period. Rutting (mating) season occurs during September and October, and bulls tend to seek open meadows to be highly visible and maintain their harems (groups of elk cows).

Bison use of the Mammoth area fluctuates year to year and is highly dependent on winter conditions. Some years, winter conditions are harsh in the interior of the park causing the bison to move to lower elevation winter ranges where forage is more readily accessible. During calving season bison frequent the area between YACC Camp area and Mammoth. As snow begins to melt and grasses emerge at higher elevations, bison leave.

The project areas are classified as high-quality spring and early summer bear habitat. 50 black bear sightings from 2007-2016 within 500 meters of the current campus (Alternative B) and proposed campus at the former corral location (Alternative C) have been reported (Gunther pers comm).

Birds observed by park personnel during spring and summer site visits near or within the project areas include the green-tailed towhee, osprey, Clark's nutcracker, boreal owl, great gray owl, great horned owl, warbling vireo, Brewer's sparrow, chipping sparrow, mountain bluebird, yellow-rumped warbler, golden eagle, prairie falcon, common raven, black-billed magpie, Townsend's solitaire, western meadowlark, and vesper sparrow.

Reptiles and amphibians that are known to occur or that may occur in the project areas include the western terrestrial garter snake, bull snakes, rubber boa, blotched tiger salamander, western (boreal) toad, Columbia spotted frog, and western (boreal) chorus frog.

Impacts of Alternative A-No Action
There would be no action and no new effects on wildlife under Alternative A.

Cumulative Effects: Because there would be no new impacts, there would be no cumulative impacts to wildlife.

Impacts of Alternative B (Yellowstone Youth Campus Redevelopment) – Proposed Action
Potential for wildlife to be disturbed would increase temporarily during the estimated six-month construction period over a three year period for each phase of the campus and for relocating of the dormitories.

Higher levels of noise and human activity from up to an additional 72 students at the campus could displace elk, bison, and black bear who utilize areas in the vicinity of the campus as a travel corridor to access forage or calving sites. Small patches of undisturbed habitat at the building sites that are potentially used by smaller species, such a nesting birds and small mammals, would be permanently lost to new construction. Disturbance effects may include energetically costly physiologic responses, nesting and foraging interruptions, avoidance or disruption of travel routes, or displacement from habitat.

The NPS expects no increase in wildlife mortalities in this area because all construction activities would be short-term, lasting no longer than three years, and confined to the immediate project area. As with all YNP construction projects, the NPS would direct the contractor to manage food and garbage to ensure it is not available to wildlife. Contractor staff would have to attend a wildlife/food management orientation safety session and abide guidelines.

The construction involved in the redevelopment of the campus could have adverse impacts on migratory birds from permanent loss of habitat in the proposed project footprint and potential mortality of eggs and chicks and nest abandonment if ground-disturbing activities occur during the nesting season. In order to avoid potential mortalities and violations of the Migratory Bird Treaty Act, bird habitat would be surveyed prior to clearing activities during the nesting season, March 1 - August 15 and occupied habitat would not be removed during the nesting season. If an active nest were encountered at any time, it would be protected from removal.

Permanent adverse impacts from loss of habitat at the campus and where the dormitories would be relocated would be 5.4 acres. Impacts would not meaningfully affect wildlife species at the population level since the project would occur in and or adjacent to an already developed area with high levels of human activity.

Cumulative Effects: Roadway improvement projects, facility and visitor service improvement projects, vegetation management activities (fuel reduction defensible space, roadside mowing, non-native weed control), and infrastructure and utility development would impact wildlife. Collectively, these actions have had and would continue to have adverse cumulative impacts on wildlife in the park. When the 5.4 acres of permanent impacts under Alternative B are combined with these other

impacts, the total cumulative impact on wildlife would continue to be adverse. Overall, the impacts under Alternative B would contribute slightly to, but would not substantially change, these ongoing cumulative effects.

The level of disturbance to wildlife from other projects would increase slightly with the addition of more students and residents in the YACC Camp or lower Mammoth housing area, and with increased traffic levels on the Grand Loop Road. The increase would be incremental, with little difference from existing impacts given already high levels of human activity in the YACC Camp and Mammoth developed area and the amount of traffic on the road. Disturbance levels would be elevated somewhat during projects near Mammoth, especially for projects that require heavy equipment, result in increased traffic volume, or take place during calving or winter seasons. A slightly elevated level of disturbance to wildlife could also be expected if ongoing, in progress, or future projects occur at the same time the campus would be redeveloped and dormitories relocated. Overall, cumulative impacts to wildlife from Alternative B combined with past, ongoing, and reasonable foreseeable actions would not affect wildlife population levels or change the overall distribution and abundance of wildlife species in the YACC Camp or Mammoth Hot Springs Area.

Impacts of Alternative C (Yellowstone Youth Campus Relocation) – Preferred Alternative

Disturbance to wildlife from Alternative C are similar to those described for Alternative B. Alternative C would result in 6.0 acres of permanent habitat loss and 11.0 acres of temporary disturbance. The project site and surrounding meadows are used by elk to bed and forage throughout the year, and importantly, are used as calving areas in the summer. Construction activity and students (140) at the campus could result in short-and long-term adverse impacts from disturbance and displacement. Impacts would not affect wildlife species at the population level since the project occurs adjacent to the Grand Loop Road and near an already developed area with high levels of human activity.

Cumulative Effects: Past, present, and reasonably foreseeable future actions under Alternative C would be the same as described under Alternative B except this alternative would have 6.0 acres of permanent impact.

Threatened and Endangered Species

Affected Environment

The USFWS has identified the following listed, candidate, or proposed threatened and endangered species as potentially occurring in the project areas (USFWS 2014). The species, and their status, include:

- Grizzly bear (*Ursus arctos horribilis*), threatened
- Gray wolf (*Canis lupus*), threatened

Species not known or with no potential of occurring in the action areas will not be discussed further in this document. Excluded species include wolverine (*Gulo gulo*), proposed; whitebark pine (*Pinus albicaulis*), candidate; and Canada lynx (*Lynx canadensis*), threatened. These species have been removed from further analysis by meeting one or more of the following conditions: 1) species does

not occur nor is expected to occur in the action areas; 2) occurs in habitats that are not present; and/or 3) is outside of the geographic or elevation range of the species.

Grizzly Bear

Management of grizzly bears in YNP has been successful in enabling grizzly bear recovery and reducing bear-human conflicts (e.g., property damage, incidents of bears obtaining human food, bear-inflicted human injuries) and human-caused bear mortalities in the park (Gunther 1994, Gunther and Hoekstra 1998, Gunther et al. 2000). The U.S. Fish and Wildlife Service removed grizzly bears in the Greater Yellowstone Ecosystem from the Federal List of Threatened and Endangered Wildlife on April 30, 2007. In 2009, a U.S. District Court returned the grizzly to the federal threatened species list, saying the Conservation Strategy was not enforceable and insufficiently considered the impact of climate change on grizzly food sources. The USFWS and the Department of Justice appealed. In 2012, a ruling was made to keep the grizzly bear on the federal threatened species list. In 2013, the Yellowstone Ecosystem subcommittee and Interagency Grizzly Bear Study Team recommended that grizzly bears be removed from threatened status.

The no action alternative A and action alternatives B and C are not located within or near bear management areas. From 2007-2016, ten grizzly bear sightings from within 500 meters of the current campus have been reported and eight from the proposed campus at the former corral location (Gunther pers comm).

Gray Wolf

In 1995 and 1996, 31 gray wolves from Canada were released in the park. A total of 14 wolves were released in the winter of 1994-1995; 17 additional wolves were released in 1996 (Phillips and Smith 1996). On May 5, 2011, the USFWS removed gray wolves in a portion of the Northern Rocky Mountain Distinct Population Segment (DPS) encompassing Idaho, Montana, and parts of Oregon, Washington, and Utah from the Federal List of Endangered and Threatened Wildlife. Gray wolves in Wyoming remain on the List of Endangered and Threatened Wildlife and continue to be subject to the provisions of our experimental population regulations codified at 50 CFR 17.84(i) and (n). Wolves reintroduced into YNP and central Idaho was classified as a nonessential experimental according to section 10(j) of the ESA of 1973, as amended (16 U.S.C. 1531). The gray wolf was removed from the federal list of endangered and threatened wildlife and from Wyoming's wolf population's status as an experimental population effective September 30, 2012. However, in September 2014, a District Court judge concluded it was unreasonable for the USFWS to determine it was necessary for Wyoming to manage for more than 10 breeding pairs and 100 wolves as a condition for delisting, but then accept a plan not including a requirement for a buffer above this minimum management target (U.S. District Court for the District of Columbia 2014a). Thus, the judge ordered the reinstatement of rules to govern the management of wolves in Wyoming as threatened pursuant to the Endangered Species Act (U.S. District Court for the District of Columbia 2014b).

Prey species for wolves are considered abundant in the park. Elk are the primary prey species. While wolves have killed prey in the Mammoth area, no wolf pack has focused its activities within the area of the proposed project areas Wolves follow prey and frequent the meadows valleys near Mammoth on established ungulate winter ranges because of the abundance of elk and bison. Currently, two wolf packs occasionally us the Mammoth Hot Springs area: the Canyon Pack (6 wolves) and the 8-Mile Pack (18 wolves).

Impacts of Alternative A– No Action

There would be no action under Alternative A, and therefore no new impacts to grizzly bears or wolves.

Cumulative Effects: Because there would be no action and no new impacts to grizzly bears and wolves, there would be no cumulative effects from this alternative.

Impacts of Alternative B (Yellowstone Youth Campus Redevelopment) – Proposed Action

Grizzly Bears

There are no bear management areas in the campus vicinity of dormitory relocation sites (Gunther et al. 1998). Potential impacts from construction activities are expected to be short-term lasting no longer than three years, and confined to the project footprint. As with all Yellowstone construction projects, the NPS would direct contractors to manage food and garbage so those items are not available to grizzly bears. All outdoor food storage would adhere to park policies already in place, ensuring no unattended food sources would be available to wildlife. Contractor staff would have to attend bear/food management orientation sessions and abide by the normal bear management guidelines.

Presently, grizzly bears are seen only occasionally traveling through the project area, long-term displacement of resident populations is therefore unlikely. While there is a potential that bear-human conflicts may occur with a small added influx of workers during the construction work phase, this potential would be reduced by implementing contractor education, and "working in grizzly bear country" protocols mentioned above. Additionally, the Park's bear management policy directs that bears be discouraged from using developed areas by removing nearby carcasses or through hazing. An increase of noise and human activity from an additional 72 students at the campus could cause long-term impacts by displacing individual grizzly bears that occasionally use nearby areas as a travel corridor to access forage or elk calving sites. However, there would no population level impacts on grizzly bears.

Cumulative Effects: There would be no measurable impacts on grizzly bear populations, breeding or movements as the project areas are located within an already developed area with human use. Impacts to grizzly bears and their habitat would be insignificant within the project area and "may affect, not likely to adversely affect" grizzly bears.

Gray Wolves

Potential impacts from construction activities are expected to be short-term lasting no longer than three years, and confined to the project footprint. Gray wolves are seen occasionally traveling through the project areas; however long-term displacement of resident populations is unlikely as the project areas are located in close proximity to an already developed area with human use and wolves use nearby areas just outside the action area as movement corridors and hunting areas. Like the Park's bear management policy, wolves are similarly managed to discourage use of developed areas by removing nearby carcasses or through hazing. Higher levels of noise and human activity from an additional 72 students at the campus could cause long-term displacement of wolves that occasionally use nearby areas as a travel corridor and to hunt elk. Overall, the amount of human

presence, vehicles, noise, and movement make it an undesirable location for wolves in general. Therefore, no population level impacts on wolves are expected. Impacts to gray wolves within the project area "may affect, not likely to adversely affect."

Cumulative Effects: State-managed hunting of wolves adjacent to Yellowstone National Park are expected in the foreseeable future and have the potential to remove wolves belonging to packs that use the Mammoth Hot Springs area. Similarly, proposed delisting of grizzly bears and human hunting adjacent to the park could potentially remove bears from the population. Increased development on private lands and improved facilities in local gateway communities may increase visitor use Roadway improvement projects, facility and visitor service improvement projects, vegetation management activities (fuel reduction defensible space, roadside mowing, non-native weed control), and infrastructure and utility development could impact threatened and endangered species. Collectively, these actions have had and would continue to have adverse cumulative impacts on threatened and endangered species in the park. When the 5.4 acres of permanent impacts under Alternative B are combined with these other impacts, the total cumulative impact on threatened and endangered species would continue to be adverse. Overall, the impacts under Alternative B would contribute slightly to, but would not substantially change, these ongoing cumulative effects.

In addition, use of the YCC Camp area and MCC generates noise, motion, and artificial light that could cause indirect negative impacts to threatened and endangered species. The behavior of individual grizzly bears may continue to be altered due to an increase in the presence of people and because of human activity in the areas. However, there would no population level impacts on grizzly bears. For gray wolves most individuals would avoid the developed area and adjacent habitats. Transient individual animals may occasionally move through the area, although this would be uncommon and no population level impacts on these species would occur. Overall, the cumulative impacts from past, present, and reasonably foreseeable future projects in combination with the impacts of Alternative B would not affect population levels or change the overall distribution and abundance of threatened and endangered species in the campus or Mammoth Hot Springs area.

Impacts of Alternative C (Yellowstone Youth Campus Relocation) – Preferred Alternative

Alternative C would create an additional habitat loss of 17.0 acres (6.0 acres permanently and 11.0 acres temporarily) at the former Xanterra corral site and introduce activities that would produce an increase in noise and human activity. This increase could result in threatened and endangered species from using the area in close proximity. The project site and surrounding meadows are frequently used by elk throughout the year, and importantly, are used as calving areas in the summer. Elk are a vital food source for grizzly bear and wolves.

Grizzly Bears

There are no bear management areas in the former Xanterra corral vicinity (Gunther et al. 1998). The potential impacts from construction activities are expected to be short-term (temporary) and confined to the immediate project footprint. As with all Yellowstone construction projects, the NPS would direct contractors to manage food and garbage so those items are not available to grizzly bears. All outdoor food storage would adhere to park policies already in place, ensuring no unattended food sources would be available to wildlife. Contractor staff would have to attend bear/food management orientation sessions and abide by the normal bear management guidelines.

Presently, grizzly bears are seen only occasionally traveling through the project area, displacement of resident populations is therefore unlikely. While there is a potential that bear-human conflicts may occur with a small added influx of workers during the construction work phase, this potential would be reduced by implementing contractor education, and "working in grizzly bear country" protocols mentioned above. Once the new facility is built, additional potential for bear-human conflicts may occur with spring, summer, and fall use of the facility. However, the Park's bear management policy directs that bears be discouraged from using developed areas by removing nearby carcasses or through hazing.

Cumulative Effects: An increase of noise and human activity from an increased capacity (140 students) could cause long-term impacts by displacing individual grizzly bears that occasionally use nearby areas as a travel corridor to access forage or elk calving sites. There would be no measurable impacts on grizzly bear populations, breeding, or movements as the project areas are located within a region of already developed areas with high human use. Impacts to grizzly bears and their habitat would be insignificant within the project area and "may affect, not likely to adversely affect" grizzly bears.

Gray Wolves

The proposed action area has historically served as a travel corridor and hunting grounds for wolves that travel through the Mammoth area from Swan Lake and/or Snow Pass trail down to the High Bridge. However, displacement of resident packs is unlikely as wolves have several other options that they frequently use just outside of the proposed action area. Higher levels of noise and human activity from the proposed construction, as well as the resulting facilities that would have an increased capacity (140 students), could cause long-term impacts and displace individual wolves that occasionally use nearby areas as a travel corridor to access forage or elk calving sites. Like the Park's bear management policy, wolves are similarly managed to discourage use of developed areas by removing nearby carcasses or through hazing. There would be no measurable impacts on Park wolf populations, breeding, or movements as the project areas are located within a region of already developed areas with high human use. Impacts to gray wolves within the project area "may affect, not likely to adversely affect."

Cumulative Effects: Past, present, and reasonably foreseeable future actions under Alternative C would be the same as described under Alternative B, except that Alternative C would have 6.0 acres of permanent impacts. The total cumulative impact on threatened and endangered species would continue to be adverse. Overall, the impacts under Alternative C would contribute slightly to, but would not substantially change, these ongoing cumulative effects.

Student Use and Experience

Affected Environment

The NPS believes exposure to nature and education programs are a core component to the park's overall youth education responsibility. Education programs' currently offered at the campus includes:

Youth Conservation Corps Program (YCC)

The mission of the YCC Program is "Work-Learn-Play-Grow." The YCC Program is structured around three program areas: resource conservation, education and recreation.

The Yellowstone YCC model has expanded to use an education curriculum with five components- ecological relationships, stewardship, cultural heritage, leadership, and sustainability. In addition, there are sessions on career opportunities, presentations by resource experts, mentoring, and feedback/evaluation sessions.

The YCC Program offers enrollees the opportunity to learn, work, and recreate in Yellowstone National Park. The program consists of two sessions in the summer for 44 youth enrollees and 6 youth leaders from across the country. Enrollees are randomly selected from more than 700 applications. Previous wilderness experience is not required, but a willingness and ability to work in a physically active setting, the ability to get along well with others, and maintain a positive attitude are essential. The program is challenging, educational, fun, and offers participants opportunities to expand their horizons while building skills that will benefit them for a lifetime. Enrollees work 40 hours per week and receive federal minimum wage (enrollees) or higher (youth leaders) with daily deductions for room and board. Healthy food options are provided by the YCC facility cook or prepared by staff and youth while camping. A variety of weather and terrain conditions are encountered while completing projects that may include: fence building; trail construction and/or maintenance; general maintenance work; painting/staining; installation of bear-proof food storage boxes in campgrounds, assisting with resource education programs, collecting data through citizen science projects, and collecting native seed for restoration projects. Some projects take place in remote backcountry locations within the park, requiring camping up to four nights. When projects are based in the front country crews stay at the YCC campus or at designated group campsites in the park. Weekend and evening activities may include: hiking, rafting, fishing, guest speakers, assisting field rangers and/or scientists, and trips throughout the Greater Yellowstone Ecosystem.

Tomorrow's Stewards Program (Other Youth Work Groups)

Yellowstone hosts a variety of youth work groups through NPS Cooperative Agreements and private organizations. Groups include Groundwork USA, Montana Conservation Corps, Student Conservation Association, and numerous colleges. While there are 150 participants annually, half utilize the YCC campus.

Expedition Yellowstone

Expedition: Yellowstone offers a 4 or 5 day curriculum-based program for students in grades 4-8. This program operates September through mid-December and mid-February through May. There are approximately 1,900 participants annually. The emphasis of Expedition: Yellowstone is on learning through direct experience in the outdoors. Students participate with teachers and parent chaperones in hikes, field investigations, discussions, and journal writings. The NPS education program manager works with teachers to tailor an itinerary for the group that best meets their educational needs. The program operates on a cost recovery fee basis to cover salaries and instructional supplies used by students. NPS staff with diverse education backgrounds instructs these expeditions throughout the park.

Impacts of Alternative A– No Action

Under Alternative A, education programs and the campus facilities would not change and remain as is and serve 1,900 students annually.

Cumulative Effects: Because there would be no new impacts and the existing campus, there would be no cumulative impacts to student use and experience.

Impacts of Alternative B (Yellowstone Youth Campus Redevelopment) – Proposed Action

Under Alternative B, the campus would be redeveloped at the existing location. The commons building, dormitories, and classroom building would expand the programs capacity to 132 students. This increase in capacity would allow for 4,700 students to participate in programs annually. The classrooms would serve as flexible spaces for teaching and learning unlike the classroom at the existing campus. Redeveloped dormitories would be able to accommodate youth groups of differing sizes and provide for increased privacy in bathroom and sleeping areas. The current campus does not allow for these accommodations. Redevelopment of the buildings, pathways, and parking area would be compliant with ABA and result in beneficial impacts to the experience of students who need these features.

The design of the campus would help create a unified area organized around a central open space in the center of campus to provide views of natural resources of the park, and enhance students' learning experiences. However, when not in the center of campus, this location would not provide students' with a greater sense of place because the campus would remain in close proximity to park housing and administrative area and could detract from the learning experience. Because of the topography of the site and the adjacent wetland, this site does not allow for future expansion. As described in the Elements Common to Action Alternatives in Chapter 2 the campus buildings would also serve as teaching tools and meet the purpose and need of the project objectives by, demonstrating the highest standards of sustainable design and construction. Opportunities to learn and observe natural systems and processes that contribute to minimizing carbon would be demonstrated through both design and technology. During redevelopment of the campus, programs would remain operational and be relocated to the MCC, therefore minimizing impacts to students participating in education programs.

Cumulative Effects: Roadway improvement projects, facility and visitor service improvement projects, vegetation management activities (fuel reduction defensible space, roadside mowing, non-native weed control), and infrastructure and utility development have in the past and would continue from future projects to have adverse impacts on student use and experience from an increase noise, dust, ground vibration from equipment, traffic delays from construction, and potential overall aesthetics. Overall, the impacts under Alternative B would contribute slightly to, but would not substantially change, these ongoing cumulative effects.

Impacts of Alternative C (Yellowstone Youth Campus Relocation) – Preferred Alternative

Under Alternative C, the campus would be relocated to the former location of the Mammoth horse corrals. The building expansions would be similar to those described under Alternative B but would expand the programs capacity to up to 140 students and fully meet the purpose and need of the project objectives. This increase in capacity would allow for 5,000 students to participate in programs annually. Similarly, the classrooms would serve as flexible spaces for teaching and learning unlike the classroom at the existing campus. Redeveloped dormitories would be able to accommodate youth groups of differing sizes and provide for increased privacy in bathroom and sleeping areas. The current campus does not allow for these accommodations. Redevelopment of the buildings, pathways, and parking area would be compliant with ABA and result in beneficial impacts to the experience of students who need these features.

The design of the campus, location, site configuration and entryway would create a unique campus setting and "sense of place" that is not crowded. These elements are lacking at the current campus because of the close proximity to park housing and administrative areas. At this location, there would be easy access to the "wild" right from the campus. This site does provide space for future expansion. Under Alternative A and B to this is not possible without a vehicle shuttle. From this location parts of the campus would be visible from the Grand Loop Road and the High Bridge along the road from Tower to Mammoth. Seeing the campus could attract visitors to inquire about the campus and increase interest in youth education programs. During redevelopment of the campus, programs would remain operational at the existing campus, therefore minimizing impacts to students participating in education programs.

Cumulative Effects: Roadway improvement projects, facility and visitor service improvement projects, vegetation management activities (fuel reduction defensible space, roadside mowing, non-native weed control), and infrastructure and utility development have in the past and would continue from future projects to have adverse impacts on student use and experience from an increase noise, dust, ground vibration from equipment, traffic delays from construction, and potential overall aesthetics. Overall, the impacts under Alternative C would contribute slightly to, but would not substantially change, these ongoing cumulative effects.

Historic Resources

Affected Environment

The regulations at 36 CFR 800 state that "[a]dverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative (36 C.F.R. § 800.5(a)(1))." There are no direct effects to historic properties as a result of this undertaking. The area of potential effect (APE) for indirect effects is visual and related to changes in adjacent historic property viewsheds as a result of the undertaking. In order to determine the visibility of the action alternatives B and C, park staff tested the visibility of the existing Youth Campus and Mammoth Corral complex. The alternatives would be potentially visible from the following historic properties within the APE for indirect effects (see Figure 1 for photopoints of visibility): Mammoth Hot Springs Historic District (48YE486), Grand Loop Road Historic District (48YE520), Bunsen Peak Road Historic District (48YE825), Fort Yellowstone NHL Historic District (48YE1057), and the Fort Yellowstone Cemetery, a discontiguous resource (Site-981) of the Fort Yellowstone NHL Historic District.

These historic properties are described below. There are no newly identified historic properties within the APE for indirect effects. The NPS evaluated the existing buildings within the Mammoth Corrals and determined they were not National Register eligible.

The National Register is the nation's inventory of historic places and the national repository of documentation on the variety of historic property types, significance, abundance, condition, ownership, needs, and other information. It is the beginning of a national census of historic properties. The National Register Criteria for Evaluation define the scope of the National Register of Historic Places; they identify the range of resources and kinds of significance that will qualify properties for listing in the National Register. The Criteria are written broadly to recognize the wide variety of historic properties associated with our prehistory and history. The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites,

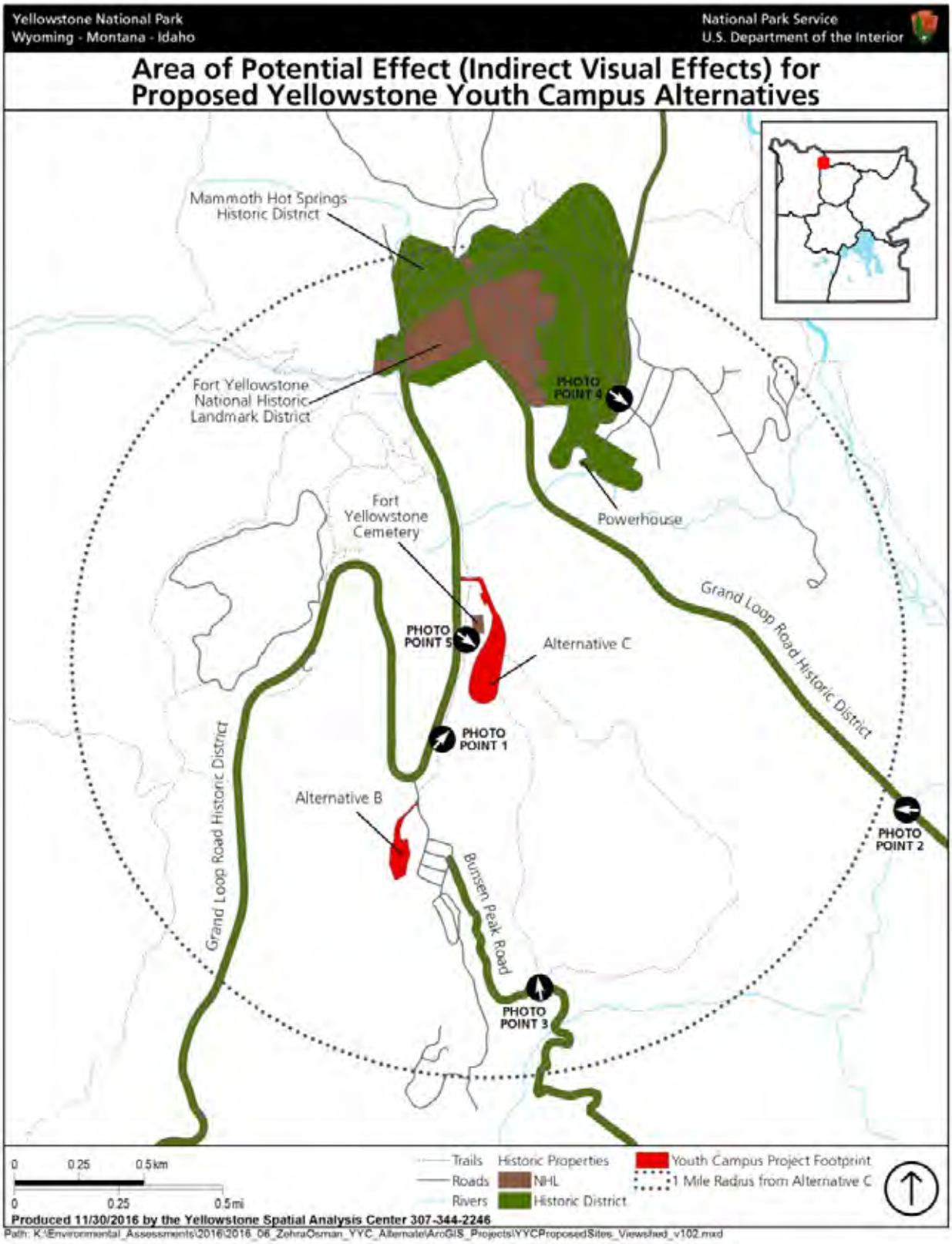

Figure 8: Area of Potential Effect (APE) for Indirect Effects. Photopoints show where proposed Campus action alternatives are visible from historic properties.

buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

Criterion A. That are associated with events that have made a significant contribution to the broad patterns of our history; or

Criterion B. That are associated with the lives of significant persons in our past; or

Criterion C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

Criterion D. That have yielded or may be likely to yield, information important in history or prehistory.

Grand Loop Road Historic District (48YE520) – The Grand Loop Road system was a 150-mile circuit system designed to connect the park's most popular attractions. Listed on the National Register of Historic Places as nationally significant under Criterion A as one of the first, the Grand Loop Road was a large-scale designed road systems planned by the federal government, and Criterion B, for U.S. Army Corps of Engineering Officer Hiram Martin Chittenden for his vital and innovative role in the development of Yellowstone's road system, his role in the very early recognition of Yellowstone's place in history in the United States, his important historical contributions to the literature of the American West, and his role toward the development of the design philosophy which the NPS later adopted for its roads and building programs. Under Criterion C, the Grand Loop Road is significant on a state level for the continuing design philosophy of the Army Corps of Engineers of blending with nature and lying lightly on the land (Culpin 2003).

The Bunsen Peak Road Historic District (48YE825) is a 5.88-mile loop road that circles up Bunsen Peak just south of the YCC Campus. It is eligible for listing on the National Register of Historic Places under Criteria A as part of the planned road system in Yellowstone National Park and is associated with the historic context Construction of the Road System in Yellowstone National Park, 1872-1966.

Fort Yellowstone Cemetery (Site-981), a discontiguous resource of the Fort Yellowstone National Historic Landmark District (48YE1057/486) is one of six discontiguous resources located outside the 45-acre Fort Yellowstone headquarters area in Upper Mammoth. The cemetery located about 0.8 miles south of Fort Yellowstone and southeast of the Mammoth Hot Springs terraces, received its first burial in 1888. The cemetery is a rectangular site enclosed with an iron pipe and concrete post fence erected by the army in 1915. There is a central gate on the west side of the cemetery. The landscape includes sagebrush, grasses, and small clusters of trees. When the army left Yellowstone in 1918, about fifty-four graves were in the cemetery, most of them civilian employees of the army and relatives of the military and civilian personnel. In 1917, nineteen remains (soldiers and civilian employees) were moved the Custer National Cemetery in Montana. Fort Yellowstone was designated a National Historic Landmark on July 31, 2003. It is nationally significant under Theme VII, "Transforming the Environment," and Criterion 1 in the areas of conservation, military, and politics/government. The landmark district is significant for its association with the military administration of Yellowstone National Park and for the impact the principles and policies developed

during the military administration of Yellowstone had on the emerging conservation and national park movements in the United States in the late nineteenth and early twentieth centuries. The period of significance for the landmark district extends from 1888, the date of the earliest extant resource associated with the military period to 1918, the permanent departure of U.S. Army troops. (Killion & Brown 2011).

North Entrance Road Historic District (48YE822) – The North Entrance Road Historic District is a 5.23- mile road that extends through the Gardner River valley from the park's north boundary at Gardiner, Montana, to the east end of the esplanade at Mammoth. The district was listed on the National Register of Historic Places in May, 2002 as nationally significant under Criterion A, being an integral part of one of the first federally planned road systems in the nation, and for possessing state significance under Criterion C for blending with nature and adherence to the park's design philosophy of lying lightly on the land. The road was nominated under the multiple property documentation for Yellowstone's roads and its associated historic context, The History of the Construction of the Road System in Yellowstone National Park, 1872- 1966. The period of significance for the North Entrance Road HD is 1883-1950 (Sargent 2013).

Mammoth Hot Springs Campground (Site-9989) is a contributing site within the Mammoth Hot Springs Historic District (48YE486). It was constructed in 1938-40 by the CCC, and is located on a mid-slope bench approximately sixty feet below the terrace containing the major concentration of concession and administrative facilities at Mammoth Hot Springs, consists of a series of one-way loop roads, with individual campsites located on either side of the roads. The campsites are designed so that a landscaped island separates the campsite from the access road. Each campsite contains a picnic table and a small fire grate. Four comfort stations are scattered throughout the campground. Mammoth Hot Springs Historic District, an irregularly-shaped, 157.8- acre historic district, include government and concession facilities that surround the open parade ground in the Upper Mammoth area. The historic district also includes portions of the Lower Mammoth area, including the Fort Yellowstone powerhouse, the original section of the employee housing area, and the Mammoth campground. Listed in the National Register on March 20, 2002, the Mammoth Hot Springs Historic District is significant under National Register Criterion A in the areas of conservation, entertainment/ recreation, and military and under Criterion C in the area of architecture. The period of significance is 1891-1948.The Fort Yellowstone resources in the Upper Mammoth and Lower Mammoth areas are also part of the larger Mammoth Hot Springs Historic District (Killion & Brown 2011).

Impacts of Alternative A (No Action)
There would be no action under Alternative A, and therefore no new impacts to historic resources.

Cumulative Effects: Because there would be no action and no new impacts to historic resources, there would be no cumulative effects from this alternative combined with past, ongoing, and future actions.

Impacts of Alternative B (Yellowstone Youth Campus Redevelopment) – Proposed Action
Components of Alternative B were found to be visible from Bunsen Peak Road Historic District, Mammoth Campground, and North Entrance Road Historic District. Photos were taken from

these viewpoints (Photopoints 3 and 4, APE Map Figure 1). There are no newly identified historic properties within the APE for indirect effects.

Under Alternative B, the new campus would be barely visible from the Bunsen Peak Road Historic District, so existing views from this historic property would change very little. A photo taken from this Photopoint 3 (See Figure 2) shows the proposed campus site is far enough away that it would be barely visible due to distance, terrain, and vegetation. Therefore, the indirect visual effect of the rehabilitated campus would have no adverse effect on the Bunsen Peak Road Historic District.

One of the existing youth campus dorms (Figure 4) would be relocated across the road (North Entrance Road Historic District) from the Mammoth Campground, which is part of the Mammoth Hot Springs Historic District (See photopoint 4, APE Map). Figure *4*: Dormitory Site 1 shows the dormitory relocation site. Figure 3 shows the view of Dormitory Site 1 from photopoint 4. The one-story brown dormitory (Figure 4) would be placed amongst other NPS houses, blending into this setting. It would be partially screened by an existing vegetated berm along the North Entrance Road Historic District. Therefore, the indirect visual effect of the proposed dorm would have no adverse effect on the Bunsen Peak Road Historic District.

The visibility of the components from Alternative B would be mitigated through design that would blend the development into the landscape and through supplemental vegetative screening. Under §106, the determination of effect would be No Historic Properties Adversely Affected.

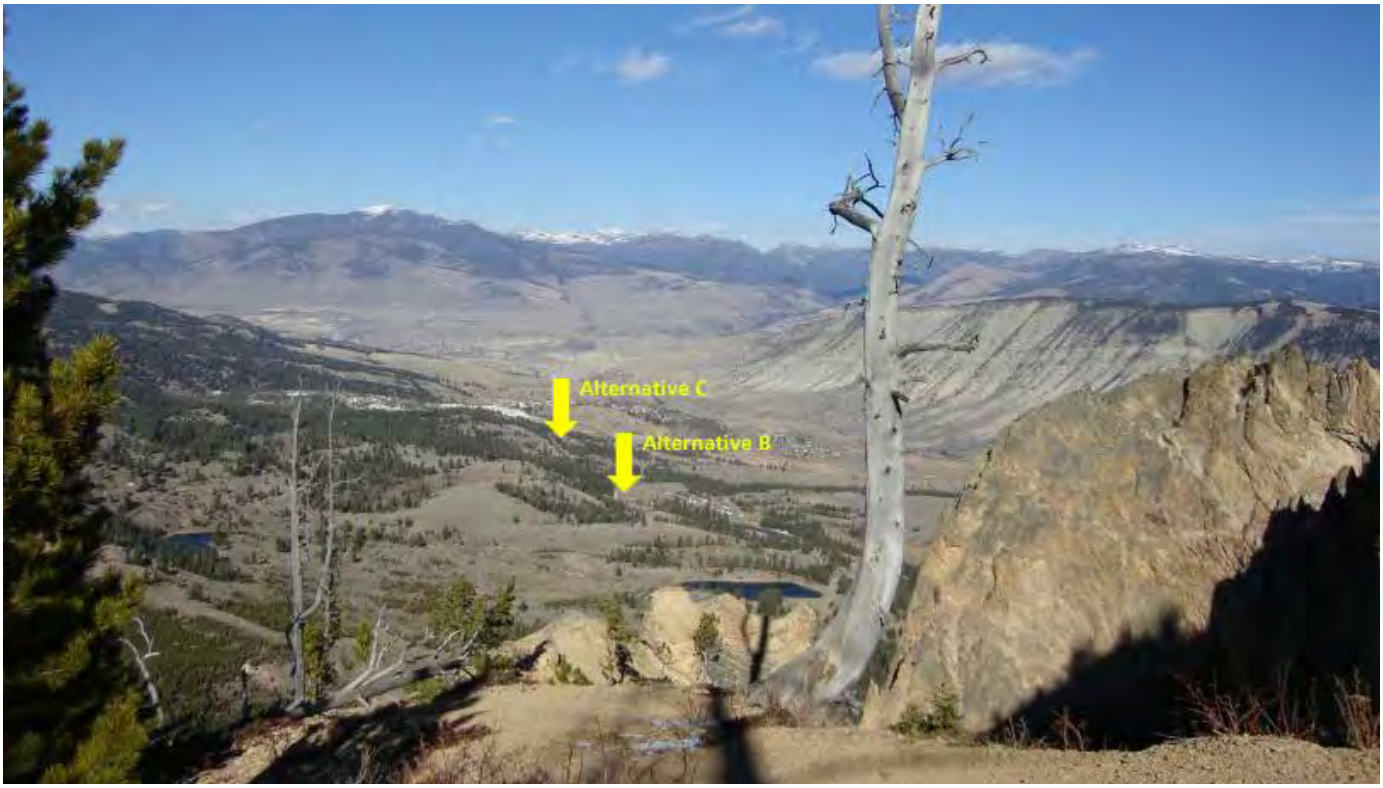

Figure 9: View from Bunsen Peak Road Historic District (Photopoint 3, APE Map Figure 1). Arrows show proposed locations of Alternatives B and C.

Figure 10: View from Mammoth Campground and North Entrance Road toward proposed relocated Dorm Site 1 in Alternative B (Photopoint 4, APE Map Figure 1).

Figure 11: Existing Youth Campus Dorm to be relocated across the road from Mammoth Campground in Alternative B.

Cumulative Effects: Historic properties in the northeast portion of the park include the North Entrance Road Historic District, the Mammoth Hot Springs Historic District, the Fort Yellowstone NHL District, and the Grand Loop Road Historic District. Past, present, and reasonable future actions in these historic districts include the North Entrance Park Street Improvements, the new Mammoth Justice Center, the 2014 Northwest Energy Substation Improvements, and the historic rehabilitations of the Haynes Studio, Mammoth Hotel, Administration Building, Mammoth Jail, and Supply Center, and future improvements to the Grand Loop Road. For all past (and future) projects, Yellowstone National Park adhered to the Secretary of the Interior Standards for the Treatment of Historic Properties in consultation with the Montana and Wyoming State Historic Preservation Offices. Thus, the building rehabilitations have had a beneficial cumulative effect on these historic properties. The new additions of buildings, roads, utilities, and future road-widening as a result of these projects have/will incrementally and collectively affect/ed the historic properties in the northeast portion of the park, though with no adverse effect in the long term. As previously described in this EA, the direct and indirect impacts of Alternative B would have No Adverse Effect on the Mammoth Hot Springs Historic District, North Entrance Road Historic District, Grand Loop Road Historic District, and Bunsen Peak Road Historic District. When the effects of Alternative B are combined with other past, present, and reasonably foreseeable future effects, there would continue to be No Adverse Effect on these historic properties. The incremental impacts of Alternative B would contribute slightly to, but would not substantially change, the impacts that are already occurring.

Impacts of Alternative C (Yellowstone Youth Campus Relocation) – Preferred Alternative

Components of Alternative C were found to be visible from Grand Loop Road Historic District, Bunsen Peak Road Historic District, and the Fort Yellowstone Cemetery, a discontiguous resource (Site-981) of the Fort Yellowstone NHL Historic District. Photos were taken of these viewpoints (see Figure 1) and photo simulations of the undertakings were developed from two of these photopoints where the developments would be most visible.

Under Alternative C, the new campus would be barely visible from the Bunsen Peak Road Historic District, so existing views from this historic property would change very little. A photo taken from this Photopoint 3 (see Figure 2) shows the proposed campus site is far enough away that it would be barely visible due to distance, terrain, and vegetation. Therefore, the indirect visual effect of Alternative C would have no adverse effect on the Bunsen Peak Road Historic District.

Alternative C would be visible from the Grand Loop Road Historic District at two locations (Photopoints 1 and 2, APE Map Figure 1). Photos and photo-simulations show the nature of the altered view from the road. A photo-simulation from Photopoint 1Figure 5) shows how the proposed low, horizontal massing and roof designs of the overall development conforms to the natural terrain and how the use of non-reflective materials, natural colors, and textures blend it into the landscape, which mitigates the overall visual impact of the proposed project. The large expanse of glass along the south façade of the commons building may cause glare during the day and may be lit at night, which would heighten the development's visibility. A photo-simulation of the view from photopoint 2 (Figure 6) shows the development one mile away at the base of a forested slope. It is barely visible due to distance, terrain, and vegetation. Overall, the indirect visual effect of Alternative C would have no adverse effect on the Grand Loop Road Historic District.

The existing Mammoth Corral structures are visible from the Fort Yellowstone Cemetery (see Figure 7). These buildings would be razed and a new staff housing area would be developed further downhill where topography and vegetation would obscure their visibility from the cemetery. The site of the razed Mammoth Corral buildings would be restored with additional tree plantings to further screen the proposed staff housing area from view (see Alternative C site plan). There would be minimal noise from the staff housing area. The proposed undertaking would have a minimal potential indirect (visual) effect on the Fort Yellowstone Cemetery (Photopoint 5 on APE Map Figure 1). Therefore, the indirect visual effect of Alternative C would have no adverse effect on the Fort Yellowstone Cemetery (Site-981).

The visibility of the new campus under Alternative C from the Grand Loop Road Historic District, Bunsen Peak Road Historic District, and the Fort Yellowstone Cemetery would be mitigated through design that would blend the development into the landscape. Supplemental vegetative screening through the transplanting of trees would further screen the development from the cemetery. Under §106, the determination of effect would be No Historic Properties Adversely Affected.

Cumulative Effects: Historic properties in the northeast portion of the park include the North Entrance Road Historic District, the Mammoth Hot Springs Historic District, the Fort Yellowstone NHL District, and the Grand Loop Road Historic District. Past, present, and reasonable future actions in these historic districts include the North Entrance Park Street Improvements, the new Mammoth Justice Center, the 2014 Northwest Energy Substation Improvements, and the historic rehabilitations of the Haynes Studio, Mammoth Hotel, Administration Building, Mammoth Jail, and Supply Center, and future improvements to the Grand Loop Road. For all past, present (and future) projects, Yellowstone National Park adhered to the Secretary of the Interior Standards for the Treatment of Historic Properties in consultation with the Montana and Wyoming State Historic Preservation

Figure 12: Photo–simulation for photopoint 1 on APE Map Figure 1 taken from Grand Loop Road Historic District under Alternative C (Mammoth-Norris).

Figure 13: Photo-simulation (Photopoint 2) APE Map Figure 1. Upper image shows a zoomed-in view of a photo-simulation of the proposed campus as seen from the Mammoth-Tower section of the Grand Loop Road Historic District at photopoint 2. Lower image shows actual view from Photopoint 2 at a more accurate scale, which is barely perceptible due to distance, terrain, and vegetation under Alternative C.

Figure 14: Photo (Photo Point 5) on APE Map Figure 1. Cemetery fence in foreground. The existing Mammoth Corral buildings are currently visible from the Fort Yellowstone Cemetery. These structures would be removed and the proposed Youth Campus buildings (staff housing) would located down slope and out of view from the cemetery (see site plan Figure 3). Additional trees would be transplanted around the cemetery as an additional visual buffer from the campus access road under Alternative C.

Offices. Thus, the building rehabilitations have had a beneficial cumulative effect on these historic properties. The new additions of buildings, roads, utilities, and future road-widening as a result of these projects have/will incrementally and collectively affect/ed the historic properties in the northeast portion of the park, though with no adverse effect overall in the long term. As previously described in this EA, the direct and indirect impacts of Alternative C would have No Adverse Effect on the Grand Loop Road Historic District, Fort Yellowstone Cemetery, and Bunsen Peak Road Historic District. When the effects of Alternative C are combined with other past, present, and reasonably foreseeable future effects, there would continue to be No Adverse Effect on these historic properties. The incremental impacts of Alternative C would add more development visible from the Grand Loop Road Historic District; however the design, materials, and color or the development would not be obtrusive and would result in No Adverse Effect to this historic property.

Visual Resources

Affected Environment

Yellowstone National Park is world renowned for its spectacular scenery and views. Open, unobstructed views with few human intrusions are an important part of the experience at Yellowstone National Park. These viewsheds give a sense of place and orientation. Protection of visual resources is important.

The current campus and the site proposed for Alternative B is removed from visitor use areas except for those accessing Joffee Lake and Osprey Falls from the Bunsen Peak Road Trailhead. The access road to these locations is adjacent to the employee housing area and east of the campus. The surrounding forest and topography screen the campus and other structures at the YCC Camp from the Grand Loop Road. Views of the area, which are approximately one-mile away can be seen from two switchbacks along the Bunsen Peak trail and at the top of the peak. However, colors of the buildings and non-reflective surfaces and materials blend with the surroundings. Roads, parking areas, and vehicles are the most visible from these vantage points. The night lighting environment at this site is utilitarian in character and is not visible from the Grand Loop Road.

At the former Mammoth corrals the proposed project location for Alternative C , a barn, two cabins, the entrance road, trail, and parking are approximately one-mile in the distant view from the High Bridge along the road from Mammoth to Tower and at select points traveling from Norris to Mammoth, both along the Grand Loop Road. The Fort Yellowstone Cemetery is located above the former corral site and is discussed in the Historic Resources section. There is no night lighting that exists from this location.

Impacts of Alternative A (No Action)

There would be no action under Alternative A, and therefore no new impacts to visual resources.

Cumulative Effects: Because there would be no action and no new impacts visual resources, there would be no cumulative effects from this alternative combined with past, ongoing, and future actions.

Impacts of Alternative B (Yellowstone Youth Campus Redevelopment) – Proposed Action

Under Alternative B, the existing viewshed of the campus would change very little. The site and buildings would remain screened by forest and topography from the Grand Loop Road. Short-term adverse visual impacts would occur to visitors accessing Joffee Lake and Bunsen Peak Road trail from redevelopment of the existing campus from construction activity, equipment, and dust plumes during the period of construction.

After construction the buildings and other associated infrastructure would be amongst other structures and likely not noticeable. Weathered corten steel and natural wood siding would be used on much of the exterior buildings to blend in with the brown and red rich tones and textures of the nearby Mammoth Hot Spring Terraces. Natural stone would be used along some of the building foundations and for landscaping. Material that is reflective would not be used. A vegetated roof would be installed on the commons building and assist in the building to merge with the surrounding landscape. Existing vegetation and natural topography would be preserved and revegetation efforts would be done to screen new infrastructure as much as possible.

The exterior colors, texture, and design of the campus would be constructed to blend with the surrounding landscape. The most noticeable long-term adverse impact under Alternative B would be the expanse of glass along the south facing façade of the commons building (Figure 15). The glass could cause a glare by reflection of direct sunlight that would be visible from two vantage points along the Bunsen Peak Trail and the top of the Bunsen Peak approximately one-mile away. Photovoltaic arrays on the roofs of buildings could also cause a glare from these viewpoints.

Figure 15: South Facing Side of Commons Building—Alternative B

Additional lighting at the campus would include exterior lighting along pathways, in the parking area and at the entry to buildings. Exterior lighting would be directed in a downward pattern to minimize sky glow and high color rendering light sources would be used to ensure light levels would be minimized but still effective. Sky glow created by the infrastructure lighting would have adverse impacts when looking east from the employee housing area. However, at this distance the observer would be within the zone of the sky glow and not contrasted against a completely dark background. To lessen impacts to the night sky, interior lighting would have automatic occupancy sensors in all room and time programmable controls for unoccupied hours. The commons building would have a preset dimming control system to allow for a range of lighting controls.

Site 1 for the dormitory relocation would cause short-term adverse impacts from construction activity and equipment. During construction impacts would be noticeable because of the proximity to the Mammoth campground and the road from Gardiner to Mammoth. However, after construction activities ceased, the dormitory would not detract from the surrounding landscape features and appear out of place because the site is within the lower Mammoth Housing area and would be among other buildings. Additional lighting from this area would not impact the night sky.

Site 2 and 3 would cause short-term adverse impacts from construction activity and equipment. During construction impacts would be noticeable to visitors accessing Joffee Lake or the Bunsen Peak Trailhead but not to visitors along the Grand Loop Road. However, after construction activities ceased, the dormitory would not detract from the surrounding landscape features and appear out of place because the site is within the YACC Camp and would be among other buildings. Additional lighting at either of these sites would not impact the night sky.

No visual impacts would occur from use of the MCC as a temporary location for education programs.

Cumulative Effects: Roadway improvement projects, facility and visitor service improvement projects, vegetation management activities (fuel reduction defensible space, roadside mowing, non-native weed control), and infrastructure and utility development could temporarily and permanently adversely impact the viewshed in Yellowstone National Park. A 70.5 foot tower has been proposed by the National Ecological Observatory Network to install an ecological research and monitoring site approximately nine miles east of Mammoth Hot Springs. When the visual impacts under Alternative B are combined with these other impacts, the visual resources would be impacted. Collectively, these actions have had and would continue to have adverse cumulative impacts on viewsheds in the park. Overall, the impacts under Alternative B would contribute slightly to, but would not substantially change, these ongoing cumulative effects.

Impacts of Alternative C (Yellowstone Youth Campus Relocation) – Preferred Alternative

Under Alternative C, the existing viewshed of the former corral site would change and new buildings, parking areas, and an expanded road would be constructed. The gear storage and staff housing buildings would be located on the north side of the site and would be screened from the Grand Loop Road and the Mammoth Terrance Drive by the existing vegetation. The buildings on the south side of the site would include the dormitories, commons and classroom building as well as a road connecting the campus buildings. These buildings, parking area, and trails would be visible

from the same location as the first group of buildings as well as from above the site along the Grand Loop Road. All of the buildings would be visible along two locations from the Bunsen Peak trail, Bunsen Peak, and from the High Bridge along the road from Tower to Mammoth.

Weathered corten steel and natural wood siding would be used on much of the exterior buildings to blend in with the brown and red rich tones and textures of the nearby Mammoth Hot Spring Terraces. Natural stone would be used along some of the building foundations and for landscaping. Material that is reflective would not be used. A vegetated roof would be installed on the commons building and assist in the building to merge with the surrounding landscape. Existing vegetation and natural topography would be preserved and revegetation efforts would be done to screen new infrastructure as much as possiblePhoto simulations, a description of the appearance of the buildings and overall visibility are described in the Historic Resources section.

Short-term adverse visual impacts would occur from construction activity, equipment, dust plumes, and other temporary construction elements associated with construction of the campus. These temporary elements would be removed upon completion of construction. Long-term adverse impacts to the viewshed would occur from the introduction of buildings, other elements that did not exist previously at the site, and from interior and exterior lighting.

Figure 16: South Facing Side of Commons Building—Alternative C

The location of the campus at this location will create changes to the surrounding lighting environment by the light spill from exterior lighting and from windows in the development. These changes would have adverse effects on the night-time visual environment from the High Bridge and from above along the Grand Loop Road (Figure 16). To lessen these impacts, exterior lighting would be directed in a downward pattern to minimize sky glow and high color rendering light sources would be used to ensure light levels would be minimized but still effective. Interior lighting would have automatic occupancy sensors in all room and time programmable controls for unoccupied hours. The commons building would have a preset dimming control system to allow for a range of lighting controls.

Cumulative Effects: The impacts from past, present and reasonably foreseeable projects would be the same as described in the cumulative effects section for Alternative B with the exception that the development associated with Alternative C would be visible from the High Bridge and from above along the Grand Loop Road. When the visual impacts under Alternative C are combined with these other impacts, the visual resources would be impacted. Collectively, these actions have had and would continue to have adverse cumulative impacts on viewsheds in the park. Overall, the impacts under Alternative C would contribute slightly to, but would not substantially change, these ongoing cumulative effects.

Chapter 4: Consultation

SCOPING

Public scoping began on August 20, 2014 with a park news release and a postcard mailing to those on the park planning mailing list. Scoping was also done through the NPS Planning, Environment, and Public Comment (PEPC) website. Scoping ended on September 26, 2014. Eighteen pieces of correspondence were received during this time. The majority of comments were in support of improvements and others included ideas for the facility, to use sustainable design practices, and installing fiber optic cable to improve phone and data reliability. Consultation was conducted with the park's 26 associated tribes at the same time that public scoping was conducted. None of the park's associated commented during scoping. This plan is also for review by all 26 associated tribes.

AGENCY CONSULTATION

In accordance with the Endangered Species Act, NPS contacted the U.S. Fish and Wildlife Service with regards to federally listed special status species. Consultation is currently ongoing and will be completed prior to a decision on which alternative to implement.

In accordance with §106 of the National Historic Preservation Act, NPS provided the Wyoming State Historic Preservation Officer an opportunity to comment on the effects of this project. Consultation with SHPO is on-going and they will review this document.

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Yellowstone Youth Campus Plan
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