

**Proposed Actions at Denali National Park and Preserve in 2021: National  
Historic Preservation Act (NHPA) Assessments of Effects**

June 2021

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## **1. Title: Interior Maintenance of Housing Units, including Historic Properties (2017-2021)**

**Description:** Routine maintenance of the interior of housing units in the DENA HQ area. When residents move out of a unit the maintenance crew makes repairs and cleans to ensure it is ready for the next resident. This primarily involves patching holes and painting walls, refinishing trim boards and doors. Occasionally the work involves replacing fixtures which involves consultation with the NHPA specialist to ensure historic items are not overlooked or discarded.

**Locations:** Park Headquarters

**NHPA Assessment of Effect:** No Effect to Historic Properties.

## **2. Title: Maintenance of Historic/Cultural Structures, sites, utilities & grounds (2018-2022)**

**Description:** For NHPA, projects should be reviewed on a case-by-case basis. Complex projects or projects with ground disturbance may require additional compliance and/or a separate PEPC entry. Project leaders must consult with the NHPA coordinator to ensure that their project falls under this Programmatic Compliance entry

**Location:** Throughout the Park

**NHPA Assessment of Effect:** No Potential to Cause Effect

## **3. Title: Maintenance of Non-Historic Structures, Facilities & Utilities Without Ground Disturbance (2018-2022)**

**Description:** This CE is for non-historic structures, sites, & grounds in which no digging occurs. (To be eligible for this programmatic CE, the activities cannot be considered undertakings per the NHPA and must have an NHPA assessment of effect of, "No Potential to Cause Effects (800.3(a)(1))" Non-historic structures, sites, utilities & grounds that are located in, near, or whose APE extends into Historic Properties (for example the Mt. McKinley Historic District, Park Road Historic District, or the Kantishna/ Wonder Lake Cultural Landscape) are excluded from this programmatic compliance document as the work could potentially affect historic properties.

**Location:** Throughout the Park

**NHPA Assessment of Effect:** No Potential to Cause Effect

## **4. Title: Exterior Maintenance of Historic Properties (2017-2021)**

**Description:** This entry is to cover the occasional exterior maintenance on historic structures in the historic district of DENA HQ. The following work is covered here: Cleaning and stabilizing of historic structures, features, fences, stone walls, and plaques using treatment methods that do not alter or cause damage to historic materials. Repainting in the same color as existing, or in similar colors or historic colors based upon an approved historic structure report, cultural landscape report, or a historic paint color analysis. Energy improvements limited to insulation in the attic or basement, and installation of weather stripping and caulking. In-kind repair and replacement of deteriorated pavement, including, but not limited to, asphalt, concrete, masonry unit pavers, brick, and stone on historic roads, paths, trails, parking areas, pullouts, etc. Repair or limited in-kind replacement of rotting floorboards, roof material, or siding. Limited in-kind replacement refers to the replacement of only those elements of the feature that are too deteriorated to enable repair, consistent with the Standards. In-kind replacement of existing gutters, broken or missing glass panes, retaining walls, and fences.

Project leader must still communicate with the Section 106 Coordinator on a case by case basis for every project that falls under this PEPC entry. The Section 106 Coordinator, in consultation with appropriate members of the CRM Team must have reviewed the project and certified that the effects of the proposed undertaking on historic properties on or eligible for the National Register will not be adverse based on criteria in 36 CFR 800.5, including consideration of direct, indirect, and cumulative effects. The Effect Finding must be "No Historic Properties Affected" or "No Adverse Effect"..

**Location:** Headquarters

**NHPA Assessment of Effect:** No Historic Properties Affected or No Adverse Effect

## **5. Title: Seasonal Installation of Two FAA Weather Cameras, Kahiltna & Ruth Glaciers (2017-2021)**

**Description:** This project would permit seasonal installation and removal of two FAA weather cameras for up to 5 years (2017-2021), following a successful trial period of operation during the 2015 & 2016 seasons.

The cameras are located at ~6,200-feet on the Kahiltna Glacier, proximate to the Kahiltna Ice Fall and ~5,700-feet on the Ruth Glacier proximate to the Sheldon Amphitheater. Working in conjunction with the FAA, park staff would temporarily place the FAA 4-camera devices on the flank of the southernmost spur of the West Ridge of Mount Hunter and the south ridge of the formation locally known as "Final Ridge" (see coordinates). The cameras would be removed in approximately mid-September each year. From these locations, the cameras provide near real time weather information that allow NPS staff to make accurate go/no-go decisions for aviation operations. This information would also be made available, via the FAA, to the public

**Locations::** Kahiltna: 62° 55.91' N, 151° 12.84' W and Ruth: 62°59'51.57"N 150°43'54.31"W.

**NHPA Assessment of Effect:** No Effect to Historic Properties.

## **6. Title: Release Prospectus for Mountain Guide Concessions Contracts (2019-2028)**

**Description:** This project proposes to release a prospectus to advertise the business opportunity for commercially guided climbing on Denali and other peaks in the Alaska Range located in the former Mt. McKinley National Park (Old Park). Up to 5 contracts may be awarded and will be ten years in length. This contract cycle follows the previous contract cycle of commercially guided mountain services in this area of the park. Contracts were awarded to 7 concessioners, not 5 as stated in the Project Description. Each concessioner is required to follow a set of requirements that specific to the operator as well as conditions that are common to all, see copies of contracts in the file. Operating Plans are reviewed on an annual basis and updated as needed.

**Location:** Old Park/ Mountains

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties

## **7. Title: Release Prospectus for Dog Sled Passenger & Dog Sled Freight Hauling Services (2015-2025)**

**Description:** Denali National Park and Preserve intends to release a prospectus for the solicitation of interested parties to compete for one Category II concession contract to provide Dog Sled Passenger Services and Dog Sled Freight Hauling Services. These services were previously competed under two Category III contracts, CC-DENA018-05 and CC-DENA003-05. Both expire on June 15, 2015 and were extended through August 31, 2017. These services for these two contracts will be covered by a single contract that will go into effect on September 1, 2017, and last for a period of ten years.

Changes in the new contract include the following: concessioner will be authorized to enter and exit the park on the north side of the Alaska Range at any location when beginning or ending overnight dog sled trips as well along the park boundary in the Cantwell area. The previous contract allowed only entry and exit from the northeastern boundary between the east side of the Toklat River and the park road corridor. Concessioner will be authorized to operate four trips simultaneously; the previous contract authorized only two trips simultaneously. Concessioner will have exclusive and unlimited use of the two Dalle-Molleville cabins along with four quinzees for overnight stays with clients during the mushing season; the previous contract authorized the use of only two park cabins.

**Location:** Throughout the Park

**NHPA Assessment of Effect:** No Potential to Cause Effects to Historic Properties

## **8. Title: Non-competitive Award of a Concessions Contract for Guided Interpretive Hiking Services (2020-2021)**

**Description:** Denali National Park and Preserve intends to non-competitively award one (1) concession contracts for Guided Interpretive Hiking Services in the Old Park and Kantishna Area. Guided Interpretive Hiking Services may include the following incidental activities: naturalist walks, photographic outings, bird watching or gold panning with hands and pans only. No overnight guided hiking is authorized under the draft contract. There are currently three concessioners offering these services in the Wonder Lake and Kantishna Area, and their contracts will expire on December 31, 2019. Two of the current concessioners will be transitioned to a Commercial Use Authorization (CUA) for the services they were authorized to provide under the expiring contracts (PEPC 83455). The historic operator who is also authorized to provide this service in the Old Park under park management limitations will be awarded a contract similar in scope for a two year length of term spanning the time frame of January 2020 through December 31, 2021.

**Location:** Old park and Kantishna Area

**NHPA Assessment of Effect:** No Historic Properties Affected

### **9. Title: Fuels Reduction Treatments, Hazard Fuels (2017-2021)**

**Description:** 5 year programmatic approval, 2017-2021 This projects permits annual planned fuels reduction to be carried out per the Hazards Fuels EA approved activities. Fuels reduction is done at Denali National Park to provide for firefighter/ public safety, by reducing flammable fuel loading around park infrastructure. Any changes to the process or geographic scope that exceeds the parameters of the EA are to be brought for separate consideration by park management. A defensible space will be created and maintained around these structures by implementing fuels treatment prescriptions to reduce or remove vegetation. This space allows radiant heat from a wildfire to dissipate, and reduces crown fire potential, thus reducing the potential of infrastructure ignition. It also provides a safer area for suppression crews to work, by making the sites more defensible and limiting the amount of time crews are exposed.

**Location:** Throughout the park

**NHPA Assessment of Effect:** No Historic Properties Affected

### **10. Title: The Critical Connections Program: studying the full life-cycle of Denali's migratory birds (2020-2024)**

**Description:** Conserving migratory species is one of the greatest challenges facing the National Park Service (NPS), particularly as human activities spread across areas used by migratory animals. Migratory birds nesting in NPS areas present unique conservation challenges because they are influenced by conditions and events in more than one part of the world, including on their wintering areas that are often thousands of miles away from their protected breeding grounds

**Location:** Birds will be captured on territories within walking distance of the Denali Park Road - generally within 2 miles of the road.

**NHPA Assessment of Effect:** No Potential to Cause Effects to Historic Properties

### **11. Title: Monitoring Passerine bird populations in Denali (2017-2021)**

**Description:** Our primary objective is to detect changes in a series of metrics associated with distribution, presence, relative abundance, and peak detection times of a suite of passerine birds over time. The following metrics will be measured annually: 1) first, peak, and last annual detection dates, 2) peak detection times within daily and annual sampling periods, 3) relative abundance, and 4) occupancy (presence), and 5) community structure.

**Location:** Along the Denali Park Road.

**NHPA Assessment of Effect:** No Historic Properties Affected.

### **12. Title: Plate Boundary Observatory (PBO) stations - Denali, monitor tectonic and magmatic process using high precision (GPS) (2017-2021)**

**Description:** EarthScope is a program of the National Science Foundation (NSF) that deploys thousands of seismic, GPS, and other geophysical instruments to study the structure and evolution of the North American continent and the processes the cause earthquakes and volcanic eruptions. It involves collaboration between scientists, educators, policy makers, and the public to learn about and utilize exciting scientific discoveries as they are being made. The Plate Boundary Observatory (PBO) is the geodetic component of the EarthScope project, designed to study the 3D strain field across the active boundary zone between the Pacific and North American tectonic plates in the western United States. Data from PBO's integrated network of GPS stations, strainmeters and seismometers, coupled with aerial and satellite imagery, are providing important temporal constraints on plate boundary deformation and are

improving our knowledge of the fundamental physics that govern deformation, faulting, and fluid transport in earth's lithosphere.

**Location:** See above

**NHPA Assessment of Effect:** No Historic Properties Affected

### **13. Title: Release a Prospectus for Glacier Landing Air Taxi and Glacier Landing Scenic Air Tour Services (2020-2030)**

**Description:** Denali National Park and Preserve intends to release a prospectus to advertise up to four (4) concession contracts for Glacier Landing Air Taxi and Glacier Landing Scenic Air Tour Services. The park user groups for these services are primarily climbers (air taxi) and tour participants/independent travelers (scenic). There are currently four concessioners offering these services, and their contracts will expire on December 31, 2019. The draft contracts to be offered will be ten years in length and will span the time frame of January 1, 2020 through December 31, 2030. There will be no changes in authorized scope from the current contract. Maps included clarify the Glacier Landing Areas open for Scenic Air Tour and Air Taxi Services.

**Locations:** Throughout the glacial areas of the park.

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties

### **14. Title: Denali Soundscape Monitoring Program: Summer Sites (2016-2021)**

**Description:** A 60-point, ten-year inventory of natural soundscapes in Denali was completed in 2015. The inventory represents a robust spatial description of the park. This proposal attempts to minimize aviation use by sampling a subset of the original 60-point grid that largely represents sites accessible on foot (78% of proposed sites.) Five south-side monitoring locations accessible by helicopter are proposed to monitor changes in aviation noise impacts in popular climbing areas. These sites are all situated in places where multiple NPS missions could be accomplished with a single flight (i.e., near base camp.)

**Locations:** Throughout the park.

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties

### **15. Title: Using citizen science and ecological field work to assess the impacts of climate and habitat changes on alpine wildlife in Denali National Park and Preserve (2019-2021)**

**Description:** This work will follow an occupancy modeling framework to assess the environmental factors related to single-species occurrence patterns as well as multi-species co-occurrence patterns. We plan to select transect routes using a stratified random approach across the length of the road corridor, stratified by ecosystem type (e.g. shrub, conifer forest, tundra). Teams will walk each transect, recording information on the detection or non-detection of each species at points spaced evenly along the transects. For most species, the sampling unit will be the points spaced along the transects. At these points, we will use line transects and distance sampling to detect ground squirrels, marmots, and ptarmigan visually or acoustically, to detect scat of any of these species, or to detect ground squirrel burrows. For pikas, we will use GIS information to select outcrops adjacent to meadows using random sampling design. At each selected point, we will assess presence visually, acoustically, and by searching for scat/hay piles. For Dall sheep, we will record the locations of individuals observed from the transects (or from the road while traveling).



To address the phenological component of our study, we will take advantage of existing datasets of ground temperatures across elevational gradients in Mt. Healy (2 transects), Kantishna (2 transects), and Igloo Creek, collected by NPS collaborator Carl Roland. Working on these same transects, we will install time-lapse normalized difference vegetation index (NDVI) cameras to record how plant "greenness" changes as a function of temperature over extremely fine spatial and temporal scales. Every 100 vertical meters along the temperature transects, we will establish perpendicular transects that contour across the slope. At evenly spaced points along these horizontal transects, we will deploy temperature loggers and time-lapse NDVI cameras. This will provide data on how - for a given elevation - variation in slope, aspect, and microtopography affect plant greenness over the course of the growing season. At each of the locations where we deploy NDVI time-lapse cameras, we will also install motion-triggered camera traps to collect high spatial and temporal resolution data on the distribution of the study species. These data can also be paired with the larger-scale distributional data of the species, which will also have time and location information..

**Locations:** North of the Alaska Range accessible from the park road corridor by ground-based vehicle.

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties

### **16. Title: Paleontological Resources Inventory and Monitoring in Denali National Park and Preserve (2016-2021)**

**Description:** The paleontological resources inventory and monitoring project aims to identify, document, and monitor fossil sites and specimens within Denali National Park and Preserve (DNA). In addition to the standardized data collection and management discussed above, staff will collect fossils that are in float, loose, or otherwise in danger of immediate removal by natural processes or humans and are of scientific importance as long as power tools and motorized equipment are not required. We may collect up to 5-10 fossils per year, but expect to collect none most years, as in the past. If a similar fossil already exists in the museum, a second sample will not be collected unless it has a high risk of theft. Fossils that are in geologic context should not be collected unless there are extenuating circumstances. Collected fossils of special scientific importance will be accessioned and stored in an approved repository. Museum specimens will be made available for loan to cooperative researchers or museum partners. We may display some fossils for outreach purposes.

**Locations:** Throughout the park.

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties

### **17. Title: Fish, stream, & other aquatic surveys (2018-2022)**

**Description:** This project seeks 5-year approval for fish, stream, and other aquatic activities conducted throughout Denali National Park and Preserve that are routine in nature and do not involve ground disturbance; including non-destructive data collection, inventory, study, research, and monitoring activities, 2018-2023. These activities must be covered under the 2008 Programmatic Agreement between the NPS and the SHPO or be activities which do not have the potential to cause effect to historic properties. Project leads must consult with the Section 106 Coordinator on a project by project basis.

**Location:** Throughout the park.

**NHPA Assessment of Effect:** No Historic Properties Affected

## **18. Title: Murie Science and Learning Center (MSLC) Educational Activities (2017-2021)**

**Description:** The mission of the (MSLC) is to promote science and stewardship on behalf of national parks in northern Alaska. MSLC Activities include:

### **MSLC Field Camp**

The MSLC Field Camp is for use by approved educational groups and NPS and partner researchers. It is owned by NPS but managed by the Managing Partner and used in accordance with an operations manual updated and approved by NPS as needed. The Field Camp operations manual is included as part of the compilation of Operating Procedures for the entire MSLC.

### **Transportation**

NPS and the Managing Partner conduct all transportation operations within DENA in accordance with existing park regulations and state and federal laws. Both organizations seek to use Concessions services when appropriate.

NPS allocates road permits annually to support MSLC activities in accordance with the Vehicle Management Plan. The Managing Partner coordinates use of available road permits in support of MSLC activities in consultation with and as approved by NPS.

### **Backcountry Usage**

All MSLC programs function in accordance with the Backcountry Management Plan and maintain highest standards of Leave No Trace. Hiking routes used for all MSLC programs are reported according to park-designated protocols.

### **Research-related activities**

All research-related MSLC activities that are not permitted under the MSLC Categorical Exclusion or another park CE must go through the park research permitting system.

### **Risk Management**

To protect all participants and partner organizations involved in the MSLC consortium, all MSLC partners maintain safety and risk management practices that meet or exceed industry standards for remote education activities. In some instances, there may be differences in the permissible practices existing between organizations. In this case the organization that collects fees and/or would be considered as the lead responsible party by a reasonable jury holds the liability and has the ultimate authority on the practices allowed.

**Locations:** Throughout the Park

**NHPA Assessment of Effect:** No Historic Properties Adversely Effected.

## **19. Title: Spring Abundance Surveys for Willow and Rock Ptarmigan (2019-2023)**

**Description:** Both willow and rock ptarmigan can be hunted with liberal season dates and bag limits. Game Management Unit 13 (GMU; specifically, 13B and 13E) receives among the most hunting effort for ptarmigan than any other GMU in Alaska (Merizon and Carson 2013). Surveys would occur between

1 and 31 May for a total of 3 to 4 days. Within each day surveys will occur during two time periods. One, sunrise and continuing for up to 2 hours after sunrise. Two, 2 hours prior to sunset and continuing to sunset. Sunrise and sunset tables will be used for Denali National Park to determine specific start and stop times. Each survey transect will be repeated twice during the peak of display activity.

**Locations:** Along the Park Road.

**NHPA Assessment of Effect:** No Historic Properties Affected

## **20. Title: Approved Commercial Use Authorizations (2019-2023)**

**Description:** Concessions Management Specialists will conduct an initial review of permit applications to determine whether the proposed action is allowable under NPS policy, and consistent with the park planning documents and the Commercial Service Strategy.

Authorized CUAs will:

- Be consistent with the purpose and significance of Denali National Park and Preserve
- Adhere to federal, state, and local laws and regulations and all National Park Service policies
- Maintain public health, safety, and well-being through:
  - o Carrying appropriate insurance
  - o Meeting all federal, state, and local health and safety codes and regulations
  - o Providing relevant safety instructions to visitors
  - o Where applicable, be provided by certified individuals and businesses
- Avoid unacceptable impact to park resources and values and is consistent with management plans, given existing use in the area
- Provide enjoyment appropriate to the park while not unduly conflicting with park programs or activities, traditional or subsistence activities, or existing NPS commercial services
- Not exclude the general public from participating in limited recreational opportunities

Denali's NEPA and NHPA compliance leads will determine if the undertaking is covered under this programmatic and identify any potential resource impacts that may require further review or consultation by the full Denali Compliance IDT.

**Locations:** Park wide

**NHPA Assessment of Effect:** Undetermined

## **21. Title: Mitigate flood damage potential on Park Road (2017-2021)**

**Description:** This project will address the creek bed material that has significantly reduced the flow on four major drainages along the park road. Over the past five years the small to medium annual flood events that have transpired in the summer months have created an excess amount of material around the intake and discharge sides of four major culverts along the Denali Park Road. These culverts now are half to two thirds full of gravel that has been carried down the creek during the high-water events. This gravel is constricting the flow of the culverts significantly and could soon restrict the flow enough to cause road damage or washouts if left in its current condition.

The culverts at Mile 9, 10, 11 & 61 are the four identified culverts at this time. Others could be discovered as flood like conditions continue during the summer months. The scope of the project would remove the excess material within the drainage 150 feet (or less) from center line of road on the intake and discharge side of the culvert. Only enough material would be removed to expose the bottom of the culvert and match the natural degree angle up to 150 feet in that direction from center line. The removal

of the material will mirror the existing drainage landscape as to not impair the aesthetics of functionality of the drainage. Other techniques can be discussed with hydrologists if so needed.

**Locations:** Park Road

**NHPA Assessment of Effect:** No Historic Properties Adversely Affected

## **22. Title: Release Prospectus for Hunting Guide Services in Denali National Park and Preserve (2018-2027)**

**Description:** Denali National Park and Preserve intends to release a prospectus to advertise up to two (2) concession contracts for Hunting Guide Services. These services are offered to the public and take place in the southwestern corner of the Denali National Preserve.

There are currently two (2) concessioners offering these services, and their contracts will expire on December 31, 2017. The draft contracts to be offered will be ten years in length and will span the time frame of January 1, 2018 through December 31, 2027. There will be no changes in authorized scope or location from the current contract.

**Locations:** Preserve areas of the Park

**NHPA Assessment of Effect:** No Historic Properties Adversely Affected

## **23. Title: A National Survey of Total Gaseous Mercury Isotope Composition (2017-2021)**

**Description:** A bulk air sampler will be deployed at the Denali National Park & Preserve air quality monitoring station. The sampler is approximately 11" x 13" x 8" and will be mounted on an existing pole within the fenced area at the monitoring site. Ambient air mercury isotope samples will be collected every other month for a year. Air samples will be collected on a pair of gold traps that will be sent to the site operator a few days prior to the start of the sampling period. The gold traps will be installed in the bulk air sampler and the sample pump will be activated for two weeks. Once the sampling period has ended, the site operator will retrieve the gold traps and return them to the USGS mercury lab located in Middleton, WI.

**Locations:** Denali National Park & Preserve air quality monitoring station

**NHPA Assessment of Effect:** No Potential to Cause Effect

## **24. Title: Interior Alaska Forest Inventory and Analysis in Denali National Park & Preserve (2018-2023)**

**Description:** In 2016, the U.S. Forest Service (USFS) signed a Joint Venture Agreement (2016-JV-11261919-028) to collaborate on the implementation of the Interior Alaska inventory with the State of Alaska Division of Forestry (DOF). 289 plots remain to be sampled, with 64 of these located in Denali's eligible and ineligible wilderness. Daily operations would consist of a crew flying by helicopter Landing Zone. data would be collected, and the plots revisited every 10 years. Boring of trees will be done when necessary to estimate site, age, or tree growth and physiological conditions. One soil sample is collected from each of three subplots. Three primary measurements are taken at this location: 1) depth of the unfrozen layer (known as current depth of thaw), 2) measurements of layer thicknesses (litter, live moss, organic) and 3) volumetric samples of the litter, live moss, organic, and mineral soils. At each of the 3 subplots, a 2.125" diameter soil core is drilled into the ground to the depth where either A) 4" of a

mineral soil horizon is encountered, B) a frozen subsurface layer is encountered, or C) a total core depth of 40" is reached. No core exceeds 40" depth..

**Locations:** Northern Portions of the New Park

**NHPA Assessment of Effect:** No Historic Properties Adversely Affected

## **25. Title: Backcountry Use Monitoring with Trail Counters and Cameras (2017-2021)**

**Description:** Denali's 2006 Backcountry Management Plan (BCMP) outlines indicators and standards to assess important Resource and Social Conditions related to wilderness character and the visitor experience. Monitoring in the 2017-2021 seasons will include ongoing field observations of informal trails and campsites, backcountry, as well as encounters with other groups while hiking and camping. These observations are made by backcountry rangers and other NPS staff using human powered non-intrusive techniques.

Two proposed monitoring efforts have a potentially greater impact on wilderness character and the visitor experience as they involve placing temporary installations each year in areas of high visitor use in the Frontcountry and backcountry, including a few in designated Wilderness.

1) Monitoring trail use by installing infrared trail counters at 10-20 formalized and informal trails each season that will mostly rotate every few years. This data will help inform the Denali Trails Strategy as well as understand trends in use levels for the management and resources program. Trail counter installation and maintenance would be accomplished by NPS staff from various work groups but mainly the Resources staff. See attached sheet for proposed installation schedule for 2017-2021. TrafX IR counters will be used and hidden from view as much as possible. These counters are in camouflaged cases 4.3 inches by 2.8 inches and have a 4.3-inch scope that is attached by a 3 ft black cable (see attached document from TrafX). In areas where the counters cannot be well hidden, small white tags will be attached to inform visitors what they are and that they should be left in place. Year-round installations for the next 5 years would be kept at: Horseshoe Lake (the busiest trail monitored by the program) and the East side of the Savage Alpine Trail, near Mountain Vista (to monitor year-round use at this relatively new trailhead). Both of these locations are outside of Wilderness and well hidden in the spruce forest.

2) The program would like to monitor use of the Grassy Pass/Otter Slide informal trail with a motion sensor camera for the month of July 2017. The area is difficult to monitor with an IR counter and park staff installed a camera here in the summer of 2015 to get an accurate count of human's vs animal traffic. Now that the Gorge Creek Trail is finished, staff would like to see if that changes the visitor use on this well-known informal trail. To minimize the impact to wilderness character, BC Monitoring staff would only like to install the camera for 1 month (July) to compare to the 2015 statistics.

**Locations:** Throughout the park

**NHPA Assessment of Effect:** No Historic Properties Adversely Affected

## **26. Title: Eldorado Mining Special Use Permits (2019-2026)**

**Description:** This serves as programmatic compliance for Special Use Permits issued per the 2016 Eldorado Creek Mining Plan of Operations Environmental Assessment. Special Use Permits and conditions will be reviewed and uploaded annually.

Kristopher E. DeVault, an agent for Eldorado Creek LLC, submitted a plan on May 22, 2015 to use a 6 inch suction dredge in 2015 on the 118 acres of valid unpatented placer mine claims Liberty #9 and Liberty #13 through #20 on Eldorado Creek. An 8 inch dredge could be used in future years. Housing for this operation would be at the Comstock Cabin. Access will be by the Denali National Park road 90 miles back to Kantishna. The Liberty Claims are located 1 mile south of Kantishna. Beginning 1.25 miles upstream from its confluence with Moose Creek and continuing up Eldorado for 2.25 miles. The existing road crosses the lower part of Moose Creek to reach the Eldorado / Slate Creek access road. The Eldorado / Slate Creek access road crosses Eldorado Creek more than 20 times from its confluence with Moose Creek and runs through all the Liberty Claims. Eldorado / Slate Creek access road has been in existence prior to the claims being withdrawn from mineral entry. Access will also be from the Kantishna airstrip which is located 1.25 miles SW from Kantishna and the confluence of Moose Creek and Eldorado. An average of 15 park passes are requested for mining operations per season. At this time a minimum of 10 and maximum of 20 trips are anticipated depending on weather, resupply trips, emergencies, initial mining operation start up, beginning of year and end of year trips. Annual road maintenance will be needed to keep the road in usable condition and will be the responsibility of the mining operator.

**Locations:** Kantishna

**NHPA Assessment of Effect:** No Historic Properties Affected

## **27. Title: Wolf and Coyote Monitoring in Denali NPP (2017-2021)**

**Description:** Capturing and radio collaring wolves each year to maintain at least 2 radiocollared wolves in each pack whose home range is at least partly within the designated wolf population monitoring zone. Wolves will be captured by means of immobilizing darts fired from a low-flying helicopter and equipped with radiocollars containing either conventional VHF transmitter beacons or satellite-linked GPS locators. Collared wolves will be located by aerial radiotracking from single-engine airplanes approximately twice monthly during March - September, and opportunistically during winter. Collared wolves are monitored most intensively during early summer (May - June) to locate dens and estimate pup production. In addition to the wolf monitoring project, we will capture and radiocollar up to 5 coyotes per year along the northeast boundary of Denali.

**Location:** Within Denali National Park and Preserve located primarily north of the Alaska Range including the Windy Creek watershed. Aircraft, motor vehicle, and/or foot travel from the Park Road. Entry into closed areas is not expected to be needed except on rare occasions, and approval will be obtained from the park's wildlife management coordinator before closed areas are entered.

**NHPA Assessment of Effect:** No Historic Properties Affected

## **28. Title: Continued implementation of a long-term inventory and monitoring program for the streams and rivers of Denali (2017-2021)**

**Description:** Water sampling of rivers and streams in the Park

**Locations:** Throughout the park

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties

### **29. Title: Routine brushing and clearing around buildings and facilities - programmatic maintenance (2017-2021)**

**Description:** This project is for cyclic landscaping maintenance in and around historic and non-historic structures and facilities in developed areas of Denali National Park. This approval permits landscaping and vegetation clearing necessary for building maintenance, public and staff safety, and access to utilities. This work mirrors the vegetation clearing standards approved for hazard fuels management for up to 29 feet from structures. Vegetation clearing and landscape maintenance must abide by the Migratory Bird Treaty Act guidelines specific to Denali (see attached) such that clearing does not happen during the nesting season. Zone 1 is a one foot radius immediately adjacent to the structure. Zone 1 would be free of all vegetation (including grass) around the foundation of the structure. This area could be mineral soil or perhaps covered with pea gravel. This zone would apply only to Frontcountry structures. Zone 2 would extend an additional 29 feet from Zone 1. Combustible vegetation would be removed from Zone 2 to create a 30-foot buffer around the structure. This area could be manicured lawns, gardens, flowerbeds, or naturally occurring groundcovers (herbaceous plants, low shrubs, and/or leaf litter).

**Locations:** Developed areas of the Park

**NHPA Assessment of Effect:** No Adverse Effect to Historic Properties.

### **30. Title: Kantishna Airstrip Routine Maintenance and Minor Upgrades - Programmatic Approval (2019-2023)**

**Description:** This programmatic compliance approval applies to routine maintenance and minor upgrades on the Kantishna Airstrip, located at the western terminus of the Denali Park Road.

Routine Maintenance includes the actions listed below; streamlined activities per the 2008 Section 106 PA.

1. Removal of non-historic, exotic species according to Integrated Pest Management principles when the species threatens cultural landscapes, archaeological sites, or historic or prehistoric structures.
2. In-kind regrading, graveling, repaving, or other maintenance treatments of all existing trails, walks and paths within existing disturbed alignments.
3. Minor realignment of trails, walks, and paths where the ground is previously disturbed as determined by a qualified archaeologist.
4. Changing the material or color of existing surfaces using materials that are recommended in an approved treatment plan or in keeping with the cultural landscape.
5. Existing roads, trails, parking, & associated features, that have been determined eligible for the National Register in consultation with the SHPO/THPO, may be repaired or resurfaced in-kind. The project, including staging areas, cannot exceed the area of the existing surface and cannot exceed the depth of existing disturbance (for the purposes of this entry the Kantishna airstrip is considered eligible for the National Register).
6. Limited activities to mitigate health & safety problems that can be handled without removal of historic fabric, surface treatments, or features that are character-defining elements, or features within previously disturbed areas or areas inventoried and found not to contain historic properties.
7. Testing of soil and removal of soil adjacent to buried tanks, provided the project does not exceed the area of existing disturbance and does not exceed the depth of existing disturbance, as determined by a qualified archaeologist.

8. Removal of both natural and anthropogenic surface debris following volcanic activity, tropical storms, hurricanes, tornados, or similar major weather events, provided removal methods do not include ground disturbance or otherwise cause damage to historic properties.

9. Maintaining existing vegetation on earthworks, trimming trees adjacent to roadways and other historic roads and trails.

**Locations:** Throughout the park

**NHPA Assessment of Effect:** No Adverse Effect

### **31. Title: Mitigate Dust on the Denali Park Road for Concessions Operations and Visitor Experience (2018- 2022)**

**Description:** This project is a three component project. The A component will purchase the Calcium Chloride and provide the funding for two seasonal WG-10's and one seasonal WG-08 who will apply the dust palliative. The B component will fund leasing a water truck for the duration of the season. The C component will fund monitoring of dust palliative migration by the Resource Management division. The A component of this project will apply dust palliatives (calcium chloride) to the park road to reduce blowing dust and fine gravel loss. This project will also renew 15 miles of road previously treated with calcium chloride up to 7 years ago. The renewed sections will receive reduced applications rates. This project will be accomplished using seasonal NPS personnel and equipment. 400,000 visitors travel the park road each season on a managed Visitor Transportation System. Dust is a significant issue as it reduces visibility from bus windows, makes breathing difficult and significantly affects the visitor experience, as Park Road

**NHPA Assessment of Effect:** No Adverse Effect

### **32. Title: Reestablish Road Design Standards on the Denali Park Road (MP 15-31) (2018-2022)**

**Description:** This project will reestablish the road width to the Denali Park Road Design Standards adopted in 2007. The project will remove material that has migrated beyond the 24'-28' standard road width. Through deferred maintenance over the years the amount of gravel has accumulated and caused the increase in road width. The road was originally widened in the early 1960's to allow for safer travel for the first 30 miles. Other factors such as natural slope degradation, unstable subbase, seismic activity, and seasonal maintenance have caused gravel migration and added additional width to the south side of the road over the past 50 years. Gravel will be extracted from the edge of the road with an excavator and placed into dump trucks. Recovered gravels will be transported to a screening plant set up at MP 26 where vegetative matter and other unusable materials will be screened out. Reusable gravels will then be stockpiled, hauled and re-spread on the driving surface to improve driving conditions and promote runoff decreasing potholes. This section of road has the highest potential for potholes and therefore receives the most complaints from visitors. Materials that are unsuitable for the road will be used in the reclamation efforts at Teklanika pit. Work will be completed by NPS day labor crews using NPS owned and rental equipment. Supplies and materials will be purchased with these funds to support the project.

**Locations:** Park Road

**NHPA Assessment of Effect:** No Adverse Effect

### **33. Title: Utilizing Quaternary chronologic techniques to constrain tectonic and climate influences on landscape evolution (2018-2021)**



**Description:** Researchers will focus sampling along the first 1/3 of the Park Road corridor from approximately the Park entrance to Sable Pass, with possible locations along the Savage and Teklanika Rivers, north of Mount Healy. They will be attempting to make geomorphic and chronologic correlations between the Healy-Nenana confluence region and the Park Road corridor. Sampling will be conducted following established procedures that are a very minimally invasive/destructive sampling procedure. They will find large boulders that have come to rest, most circumstances by prior glacial positions, and remained stationary. They will collect an approximate 3 grams of quartz-rich rock from the boulder by attempting to find small flakes and fractures on the surfaces to pry the rock fragments from. The samples are generally about 1-3 cm in thickness and about the size of one's palm.

**Locations:** Several key locations have been determined both the north and south of immediate access from the Park Road corridor and may require other transport means. During FY18 we plan to focus on the region between the Park Entrance and Sable Pass with potential locations north of Mount Healy along the Teklanika and Savage Rivers.

**NHPA Assessment of Effect:** No Historic Properties Affected

### **34. Title: Section 110 Archeological Inventory (2018-2022)**

**Description:** This project will encompass all activities that help fulfill the Park's legal responsibilities under Section 110 of the National Historic Preservation Act (54 U.S.C. 306102) to identify, evaluate, and protect historic Properties. Section 110 inventory activities include survey, evaluation, testing, and protection of cultural resources (archeology sites, historic structures, cultural landscape, museum objects, and ethnographic resources).

**Survey:** Whenever possible survey areas will be accessed on foot or by non-motorized watercraft. Remote locations (greater than 8 miles for roads) may be accessed via fixed wing or rotor aircraft. The number of helicopter landings will vary per year based on 110 survey area needs; the MRA is in process. As of 2018 less than 1% of the park has been surveyed for cultural resources.

**Subsurface Testing:** Subsurface testing will be limited to what is needed to establish deposition context at sites. Shovel tests will be 30x30cm in diameter. Test Units (1x1m) may be excavated on a very limited basis with Park Archeologist approval. When conducting condition assessments of sites additional shovel tests may be excavated to help determine site significance and eligibility for the National Register of Historic Places.

**Collections:** In general, surface collections will not be made unless the artifacts are of distinct material or form or are in danger of being looted, destroyed, or removed. All items found in subsurface contexts will be collected. All collections will be cataloged and accessioned into the DENA collections by DENA staff.

**Locations:** Throughout the Park

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties

### **35. Title: Dynamics of the Denali Caribou Herd (2018-2021)**

**Description:** The overall goals of this research during FY2018 - FY2021 are to continue monitoring long-term population trends, vital rates, and other population characteristics that determine the status of the Denali Caribou Herd, and to complete research on survival patterns and habitat selection of male caribou.

**OBJECTIVES**

1. Estimate the population size and composition in late September each year.
2. Determine productivity, survival patterns and age structure of adult females;
3. Assess calf production and recruitment;
4. Investigate the patterns of survival and habitat selection of male caribou;
5. Relate caribou population status, trends, and vital rates to climatic variables and predator population characteristics.

**Capture and Radiocollaring:** Female caribou are captured by helicopter darting and radiocollared to monitor survival, productivity and movements, and composition surveys and herd counts. In March, I instrument 12 female calves to provide recruits for the age-structured sample and to monitor productivity of young age-classes. Females captured as 10-month-olds but not recruited into the age-structured sample have their collars removed at about 4 years of age.

We use carfentanil citrate/xylazine hydrochloride for immobilizing. A Supercub working with the helicopter locates caribou for darting, monitors darted caribou during induction, and checks on caribou captured on previous days. Once a caribou is immobilized, it is fitted with a radiocollar and standard body measurements are taken. Once processing is completed, caribou were given naltrexone hydrochloride and yohimbine hydrochloride to antagonize the effects of immobilants.

**Radiotelemetry:** Radiocollared caribou are relocated by radiotracking from fixed wing aircraft every 2 months. In addition, female caribou are located to assess natality (mid-May), and to aid in composition surveys and the annual census.

**Pregnancy assessment:** In mid-May, all radiocollared cows  $\geq$  2-years-old are located by helicopter and observed to assess their pregnancy status based on a calf at heel, udder distension, or hard antler presence.

**Composition surveys:** I conduct 2 helicopter surveys to assess the age/sex structure of the herd annually (early June, late September). During these surveys, a search area based on the distribution of radiocollared caribou immediately prior to the survey is intensively searched and all caribou encountered are approached at close range with a helicopter and classified by age and sex.

**Population estimation:** Annual herd size is determined from an estimate of the number of adult cows in the population based on postcalving survey results. We intensively search each survey block by helicopter without the aid of radiotelemetry. Caribou groups encountered are counted and classified, and we determine the occurrence of marked individuals within groups via radiotelemetry. Simultaneously, a Supercub locates all radiocollared females in or adjacent to the survey block. Periodically through the survey, we compare notes between the 2 aircraft crews to determine marked groups missed by the helicopter in areas already surveyed; those groups are then relocated by the helicopter and counted. In addition to adding these caribou to the totals counted, this information provides an assessment of sightability relative to group size during the survey. Because most cows and calves tend to be in large groups at this time of the year, sightability is generally very high and strongly related to group size.

**Locations:** Throughout the Park and Preserve

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties

### **36. Title: BLM AIM Aquatic Surveys in Kantishna (2018-2021)**

**Description:** This project will work towards assessing the condition of placer mined and reclaimed streams in order to prioritize restoration project needs. The field assessments will be conducted in partnership with experienced BLM field crews using their proven National Aquatic Monitoring Framework (NAMF) methodology. 2018 is the initial pilot year for the study with plans to continue surveys in the Kantishna Hills for approximately 2-3 weeks a year for the following 2-4 years. DENA is currently working with BLM to create a spatially randomized design (see attached map) for a total of 30-40 random sample sites and approximately 10-15 targeted sites (mined and reclaimed locations). The random sample sites are chosen from a list of Base and Oversample sites; when a Base site fails to meet site criteria, an Oversample site will be used in lieu of.

**Locations:** Streams and Rivers in the Kantishna Area

**NHPA Assessment of Effect:** No Historic Properties Affected

### **37. Title: Using citizen science and ecological field work to assess the impacts of climate and habitat changes on alpine wildlife in Denali National Park and Preserve (2019-2021)**

**Description** We will assess how abiotic conditions, habitat and land cover, plant phenology, and species interactions affect the occurrence of key alpine vertebrates: collared pikas, AGS, hoary marmots, Dall sheep, and ptarmigans. Research will provide broad-scale maps of the distributions of these species, as well as detailed spatio-temporal predictions for how they will respond to changing abiotic condition, land cover, and plant phenology. The project will also develop a citizen science program that engages park visitors in the process of ecological science, while contributing data that can be used to address the study objectives.

**Locations:** Throughout the Park

**NHPA Assessment of Effect:** No Historic Properties Affected

### **38. Title: Dinosaurs of the lower Cantwell Formation, Denali National Park and Preserve: insights into a Late Cretaceous, high-latitude ecosystem in a greenhouse world (2019-2021)**

**Description:** Multi-day backpacking trips into areas and will request backcountry permits for the areas we intend to camp in. Our primary target period for fieldwork will occur between June 24 and July 7, 2019. However, we may visit other sites in the LCF as day trips or short overnight trips at any point during the summer season (June-September). At specimen sites, individual specimens will receive a field number and a GPS waypoint. Significant specimens will be photographed, and a subset will be imaged using photogrammetry. Silicone peels (Silputty) will be made for some tracks when size, weather and preservation are appropriate. In addition to possibly collecting tephra (volcanic ash) samples for radiometric dating (approximately 1 gallon of sediment, volumetrically), we also request the option to physically collect a small number of fossils when necessary. We will do this sparingly and will limit our collections to body fossils (bones/teeth) or particularly significant track specimens that will be at risk of being lost due to erosion. When possible, we will inform the park geologist or his representative before collecting. To date, our collections have been very minimal.

**Locations:** Big Creek drainage, park at the Tattler Creek pullout and hike north up the drainage. We will cross over a saddle east of Sable Mountain into the drainage.

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties

**39. Title: Monitor physical and biological components of permafrost on burned and un-burned sites near Gosling Lake, Denali National Park and Preserve (2019-2023)**

**Description:** This sampling period, the research project will utilize the platform of an unmanned aircraft system (UAS) with a swappable payload to carry a multi-spectral sensor and a radiometric thermal sensor. The UAS will be operated between 100 and 120 meters AGL, at speeds of 10-15 mph over both transect sites. There will be ~ 8 take-offs and landings per transect site (~50 acres each), and each flight segment lasting 10-12 minutes each, totaling ~ 2 to 2.5 hours of flight time for the entire research area. Other UAS operations related to natural and cultural resources best practices, digital security, etc. can be referenced through the Small Unmanned Aircraft Systems in NPS Operations Programmatic Approval 2019-2023, Project ID 84620 in PEPC

**Locations:** Northwest area of the Park

**NHPA Assessment of Effect:** Potential to Cause Effect to Historic Properties

**40. Title: Grizzly Bear Population Ecology and Monitoring Study (2019-2022)**

**Description:** The objectives of this study are to understand the dynamics of the grizzly bear population and to identify factors primarily responsible for affecting those dynamics in the east end of Denali National Park and Preserve.

Summary of proposed field methods and activities:

The study relies on radiotelemetry to acquire information about individual bears and therefore requires catching animals to attach radio collars. Bears in the study area are located for capture using a small fixed-wing aircraft. Once located, bears are darted from a helicopter using an immobilizing drug delivered in a projectile syringe fired from a syringe rifle. Darted bears are monitored from the aircraft until they are immobilized, at which time the helicopter crew lands to process the bear.

Standard morphological measurements, such as head and neck circumference and body length as well as weight, are taken to monitor growth and physical condition. Bioelectrical impedance analysis (BIA) is used to determine percent body fat. BIA is the same method used to determine body fat in humans. The resistance measurement is entered into a formula specific to grizzly bears to calculate percent body fat. Blood samples are collected to assess disease exposure.

**Locations:** Researcher is authorized to work in "eastern" study area during this phase of the project from roughly Kantishna east to the east park boundary, north of the Alaska range.

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties.

**41. Title: Access to Rainy Creek (ANILCA inholding) Special Use Permit (SUP) for construction of Guest Facilities (2021-2022)**

**Description:** Denali National Park and Preserve is preparing to issue a one-year (May 1, 2021 - April 30, 2022) special use permit (SUP) for the activities requested by Hank Swan on behalf of the Kantishna Hills LLC owners who are initiating construction of 5-10 cabins and employee dorm, renovation of an existing cabin, and construction other structures as part of a lodge facility on their three private parcels (13 acres total) on Rainy Creek. The applicants are requesting use of national park lands to stage equipment and construction materials, an additional 60 road travel permits in 2020 to transport equipment and materials to Kantishna, permission to use a helicopter to sling-load construction materials

from two of the requested staging areas on NPS land to their property, permission to use a helicopter to transport employees to the Kantishna airstrip if stranded by high water on Moose Creek, brushing of roads and staging areas, and use of a snowmachine and groomer to create a fixed-wing aircraft winter landing strip on NPS land near their property and a snow machine trail stretching between Glen airstrip and Rainy Creek inholding property.

The helicopter use is in support of construction only with constraints on daily operation timing. Sling-loads would allow transport of materials during the early season (June) period when the volume of water in Moose Creek is typically high making crossing the creek multiple times with high-clearance vehicles unsafe. Sling-load operation would also be allowed during the rest of the summer season with constraints on daily or weekly timing to minimize noise intrusions on Moose Creek area hikers. Use of the helicopter sling-loads will provide for more efficient delivery, facilitating summer construction, which would likely reduce the amount of and length of time materials are stored on NPS lands. The applicant will be encouraged to use the end of visitor season period (after Road Lottery) to use the road access to pre-stage materials for the following winter and spring prior to the start of visitor season.

**Locations:** Kantishna

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties.

#### **42. Title: Quinzee Huts Winter and Summer Locations (2019-2023)**

**Description:** This project is to seasonally place and replace Quinzee huts along the park road. Quinzee huts will be transported along the park road using NPS crews and equipment to various locations in the Spring for Summer storage and use and again in the Fall for use by concessioners. The move requires dump trucks, flatbed trailers (in some cases), pilot vehicles, and laborers to stabilize the foundation when placed in their new locations.

Any changes in siting or number of quinzees pursuant to this programmatic compliance is to be brought before compliance for management review and approval. Locations are to be reviewed and updated accordingly in PEPC on an annual basis.

Placement and storage of quinzees is to remain outside of Wilderness and must be considered relative to the cultural landscape.

**Locations:** Along the Park Road

**NHPA Assessment of Effect:** No Adverse Effect

#### **43. Title: Trails Maintenance Plan (2018-2023)**

**Description:** Trail Maintenance Plan, Trail Standards, and Trail Classification for Denali National Park and Preserve. This project seeks 5-year approval (thru Dec 31, 2023) to work on "in-kind cyclic" maintenance, stabilization and rehabilitation of existing trail systems located within Denali National Park and Preserve. SEE DOCUMENT TITLED Trails Maintenance Plan for FULL description of project. Project Lead must report on an annual basis to the compliance team all projects completed under this approval.

**NON-HISTORIC TRAILS:** Work is allowed under this plan on existing non-historic trails that are located within previously disturbed areas and do not exceed the depth of the previous disturbance. This work may include the following and comparable work:

- In-kind regrading, graveling, repaving, or other maintenance treatments of all existing trails, walks and paths within existing disturbed alignments.
- Minor realignment of trails where the ground is previously disturbed as determined by a qualified archeologist.
- Routine trail maintenance and cleanup with no ground disturbance.
- Removal of dead and downed vegetation using equipment and methods that do not introduce ground disturbance.

**HISTORIC TRAILS:** Including the Horseshoe Lake, The Triple Lakes, Savage Canyon, McKinley Bar, and Mt. Healy Overlook Trail. The following maintenance is allowed on these trails:

- Repair, routine maintenance, or resurfacing in-kind. The project, including staging areas, cannot exceed the area of the existing surface and cannot exceed the depth of existing disturbance.
- Tree management.
- Routine maintenance of vegetation within CL with no changes in layout or design.
- Routine roadside and trail maintenance and cleanup with no ground disturbance.
- Removal of dead and downed vegetation using equipment and methods that do not introduce ground disturbance.

**SIGNS:** The following is allowed in regard to signs under this approval:

- Replacement of existing signage in the same location with similar style, scale and materials.
- New signs that meet NPS standards, provided the sign is not physically attached to a historic building, structure, or object (including trees) and the sign is to be located in previously disturbed areas or areas inventoried and found not to contain historic properties.
- Replacement of interpretive messages on existing signs.
- Small developments such as paved pads, benches, and other features for universal access to signs, in previously disturbed areas or areas inventoried and found not to contain historic properties.
- Temporary signage for closures, etc. in previously disturbed areas or areas inventoried and found not to contain historic properties..

**Locations:** Throughout the Park

**NHPA Assessment of Effect:** No Adverse Effect

#### **44. Title: Small Unmanned Aircraft Systems (sUAS) in NPS Operations (2019-2023)**

**Description:** This programmatic approval for NPS UAS (Unmanned Aircraft Systems) operations in Denali Park and Preserve permits training flights, use in emergencies (e.g. Search and Rescue), and administrative flights as defined under both 1(b) of the Conditions and Exceptions clause of the NPS Director's Policy Memorandum 14-05, Unmanned Aircraft - Interim Policy and NPS Reference Manual 60 - Aviation Management, Chapter 17 and Appendix 7. Permissions for UAS flights under NPS operational control for administrative purposes, such as:

- Scientific study
- Search and rescue operations
- Fire operations, law enforcement
- Natural and cultural resource stewardship
- Education/interpretation
- Training flights.

**Locations:** Throughout the Park

**NHPA Assessment of Effect:** No Adverse Effect

#### **45. Title: Special Use Permits: Special Events (2019-2023)**

**Description:** The Backcountry Management Plan (2006) includes two tools to guide decision making related to trail formation and general access: Table 2-12: Decision Guide for Addressing Social Trail Formation and Table 2-11: Access Management Tools This compliance document covers the issuance of a Special Use Permit (SUP) for special park uses and events occurring within Denali National Park and Preserve. This programmatic categorical exclusion (PCE) document will serve as a formal record for routine activities and functions performed under the SUP program related to events and requests for calendar years 2019 through 2023. This document only covers activities that have no potential to cause effect to historic properties.

**Locations:** Throughout the Park

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties.

#### **46. Title: Gray Jay Foraging Ecology (2018-2021)**

**Description:** The goal of this project is to examine foraging behavior and diet of Gray Jays to quantify vulnerability to changes in food availability. This project builds upon work already occurring on Gray Jays in the park and will take place in the study area previously outlined for the NPS Gray Jay study, between mile 237 of the Park's Highway and mile 4 of the Park Road. The study area is generally outside designated wilderness.

**Locations:** From the Park Entrance to Mile 4 of the Park Road.

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties.

#### **47. Title: Double Mountain Radio Repeater Site (2020-2021)**

**Description:** This project addresses historic radio dead spots along Denali National Park Road, between Savage River (Mile 15) and Sable Pass (Mile 38) due to existing repeater locations and area terrain. The historic radio dead spots inhibit emergency services, employee tracking, visitor services, and road maintenance, providing a significant operational impediment and safety issue. The project will install a temporary radio repeater on Double Mountain where existing seismic equipment (63.60657, -149.47013) is already located, and will fill in most if not all of the known radio dead spots. If this location is not found to be suitable, an alternative location (63.6434167, -149.5081333) to the north of Double Mountain will be used instead

**Locations:** Double Mountain

**NHPA Assessment of Effect:** No Adverse Effect.

#### **48. Title: Small-Mammal Monitoring at The Rock Creek Legacy Plots in Denali National Park and Preserve by CAKN (2020-2024)**

**Description:** Small mammals or voles have been monitored using mark-recapture methods via live-trapping techniques in Denali National Park and Preserve (DENA) since 1992. The objective of this project is to continue in perpetuity the long-term monitoring of small-mammal population dynamics, including estimates of density and abundance, on the Rock Creek legacy plots in DENA. The monitoring involves mark-recapture sampling via live-trapping of three species of voles (*Myodes rutilus*, *Microtus oeconomus*, and *Microtus miurus*) on four long-term monitoring plots established in 1992 (21 years ago). Each plot is approximately 0.8 ha in area and is comprised of a 10m x 10m grid containing 100 Sherman live-traps placed 10m apart in a square configuration. We conduct small-mammal trapping for four nights in mid-August annually (usually around August 12). Our field procedures follow methodology described by Furtch (1995) and Rexstad (1996, 2005) in which traps are: baited with irradiated sunflower seeds (microwaved to prevent germination of the sunflower seeds in DENA); padded with biodegradable cotton bedding (nestlets) and down for warmth; and are covered with plastic trap covers to keep animals dry. The 400 traps we deploy are checked three times daily (0600, 1300 and 2000). When we capture animals, they are identified by sex and species, and we determine their net weight and reproductive status. We implant unmarked individuals subcutaneously between the shoulder blades with passive integrated transponder (PIT) tags.

**Locations:** Alaska, Denali National Park and Preserve, Rock Creek Drainage

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties.

#### **49. Title: Spring Small Mammal Monitoring in The Rock Creek Watershed (2020-2022)**

**Description:** The purpose of this study is to add to the existing CAKN small mammal monitoring program by conducting an additional monitoring session during the second week of June. This would allow us to draw comparisons to spring trapping sessions completely between 1992 and 2002, and to establish a better understanding of overwinter survival of small mammals. Methods for this project would mirror those established for the current CAKN small mammal monitoring program, with the primary difference being time of year. Location of plots and camp would remain the same. Field work would consist of two days of establishing camp and setting out traps, four days' worth of trapping (4 plots of 100 traps checked 3x/day), and a final day to break camp. We utilize Sherman live-traps and use PIT tags to conduct mark-recapture analysis.

**Locations:** Rock Creek watershed, same location as currently establish CAKN small mammal monitoring plots.

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties.

#### **50. Title: The Critical Connections Program: Studying the Full Life-Cycle of Denali's Migratory Birds (2020-2024)**

**Description:** Document year-round movements of migratory birds that nest in Denali and assess how conditions across their year-round range affect their ability to return to their northern breeding grounds and successfully produce young. Summary of proposed field methods and activities:

1. Capture and remove tracking devices from individuals captured in previous years.
2. Individuals will be captured by luring them into mist nets using audio play-back calls.
3. After removing the tracking device, individuals will be released.
4. Non-target individuals captured will be banded with USGS aluminum leg bands. A blood sample will be collected for contaminant analysis.
5. Some non-target individuals will also be banded with plastic color-coded leg bands to help identify them in future years and for future studies.

**Locations:** Includes the area within 2 km of the Denali Park Road and within 2 km of park campgrounds.



**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties.

## **51. Title: Removal of Non-Historic Materials and Downed Aircraft from Glaciated Environments in Denali National Park and Preserve (2020-2029)**

**Description:** This project would allow the removal of non-historic materials, including downed aircraft, from glaciated areas of Denali National Park and Preserve for up to ten years (2020 - 2029). Actions taken under this authorization would be reviewed annually during the ten year period. Such removal efforts may require a variety of actions, including but not limited to overnight stays by removal personnel, use of fixed wing aircraft, use of helicopters for sling loads, and helicopter landings. Activities addressed by this project include:

- Removal of materials and structures, including downed aircraft, from glacial environments. Glacial environments include glaciers, moraines, and adjacent areas of exposed bare rock. Removal of debris from areas of the park covered in soil or with a higher potential for the presence of cultural resources are not included in this project and would require additional compliance.
- Removal of only non-historic materials and structures. Removal of historic materials requires additional review and compliance.
- The use of helicopters for debris removal including in designated and eligible wilderness.

Activities not addressed by this project that would require additional compliance include:

- Activities likely to affect cultural resources (such as if digging or disturbance of soil is required)
- Activities that would normally require a special use permit that are not specifically included in the list of activities addressed by this project
- Installations in wilderness, including monitoring equipment

Additional requirements guiding the removal of materials and structures from glacial environments may be imposed with a special use permit, additional project-specific compliance, or other mechanism on a case-by-case basis.

**Locations:** Glacial environments throughout the Park

**NHPA Assessment of Effect:** No Adverse Effect to Historic Properties.

## **52. Title: Rehabilitate Interior of Historic Superintendents Residence, P23**

**Description:** This project will rehabilitate the interior of the historic Superintendents Residence (P23) and install for the first time a fire sprinkler system in an important building with overnight occupancy. The work includes demolition of non-historic gypsum board wall and ceiling finishes throughout, and demolition of the kitchen and bathrooms on the 1st and 2nd floor. New plumbing, fire sprinkler, fire alarm, and electrical systems will be installed throughout, according to current code requirements. New finishes and fixtures (including kitchen, bath and lighting fixtures) will be selected appropriately compatible with this historic building, and to improve the functionality of the house so that it can be comfortably occupied. In addition, new energy efficient mechanical equipment, including a high efficiency boiler and Heat Recovery Ventilator (HRV), will be installed, and all exterior walls will be insulated to the maximum extent possible. A vapor barrier and radon mitigation fan will be installed to prevent moisture problems and ensure healthy indoor environment. Some interior doors, most windows, and some of the wood flooring is original to the building (dating to 1941) and will be rehabilitated according to historic standards. Minor repairs to the original concrete basement walls will be made where duct penetrations have been cut in the past.

**Locations:** Park Headquarters, mile post 3.2 of the Park Road

**NHPA Assessment of Effect:** No Adverse Effect to Historic Properties.

### **53. Title: Subnivean Camera Trapping in the Rock Creek Watershed (2021)**

**Description:** Deploy 6-8 subnivean (in the snowpack) camera traps in the area surrounding the Rock Creek small mammal plots to test feasibility of a non-invasive winter population study, to take place in 2021. Primary goals are to test two different motion-detecting cameras, two different containers for the traps, and assess potential for calculating population metrics using camera data. Camera traps would be located in boxes underneath the snow with open ends, allowing animals to pass through the box and be captured by the camera, mounted on the top. Traps would be deployed by digging down to place boxes at ground level, covering with snow, then left in place until snowmelt. Once cameras were melted out to the point of being visible, they will be collected.

**Locations:** Rock Creek watershed - between existing CAKN small mammal monitoring plots RR1 and RR2.

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties.

### **54. Title: 2021 Denali National Park and Preserve Superintendent's Compendium**

**Description:** This compliance addresses the 2021 Denali National Park and Preserve Superintendent's Compendium. 2021 changes have been implemented with respect to the following:

2.1(c) (1-3) Collection of fruits, nuts, etc.

Clarification that edible materials collected in the park do not have to be consumed within the park.

430(i)(1) Designated roads, parking areas, and trails open to electric bicycles, or specific classes of electric bicycles

Addition of new language to address a new activity.

4.30(i)(7) Electric bicycle use restrictions/conditions

Addition of new language to address a new activity.

13.50

Addition of language to reflect the requirement in Executive Order 13991 that masks are worn and physical distancing is maintained on NPS property to limit the spread of COVID-19 and protect public health and safety.

Addition of language addressing permitting for commercial filming pursuant to an injunction issued under *Price v. Barr*.

13.934(b) Denali Park Road permits

Minor updates to reflect current conditions and permitholders.

The proposed changes described above represent clarifications and minor amendments to existing regulations. A public comment period regarding proposed changes to the compendium was open from January 15, 2021 - February 15, 2021. Two non-substantive comments were received.

General information about park compendiums:

The Superintendent's Compendium is the summary of park specific rules implemented under the discretionary authority of the park Superintendent. The park compendium is updated annually and is a written compilation that

addresses designations, closures, permit requirements, and other restrictions and/or specifications imposed under the discretionary authority of the superintendent. The Superintendent's Compendium is prepared in accordance with the delegated authority contained within the regulations in Title 36, Code of Federal Regulations, Chapter I, Parts 1 through 7, as authorized by Title 54, United States Code, Section 100101 and 100751, and establishes regulatory provisions for Denali National Park and Preserve. Parts 1 through 6 are general regulations applicable to all areas of the National Park System, and Part 13 contains special regulations specific to individual parks in Alaska.

The park compendium does not contain those regulations found in 36 Code of Federal Regulations (CFR) and other United States Codes (U.S.C.) and CFR Titles which are enforced without further elaboration at the park level. Regulations set forth in the Superintendent's Compendium are categorically excluded under the National Environmental Policy Act (42 USC 4321 et seq.); Council on Environmental Quality regulations (40 CFR Parts 1500-1508); U.S. Department of the Interior (DOI) regulations (43 CFR Part 46); DOI Manual part 516; and NPS Director's Order 12 - Conservation Planning, Environmental Impact Analysis, and Decision-Making. **NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties.

### **55. Title: Effects of Nest Predation and Predator Abundance on Habitat Quality for Nesting Birds Across A Rapidly Changing Landscape**

**Description:** Our overall goal is to identify the habitat characteristics and successional stages whereby habitat quality is maximized for birds nesting in a rapidly changing landscape in Denali by identifying habitat patterns in reproductive success of a suite of nesting birds across the range of habitats in which they occur in Denali, from forests to alpine shrub-tundra ecotone. We propose to search for nests in a broad corridor along the Denali Park Road starting near Mile 7 and extending as far west as Mile 75. Within this area, we will limit our searches to shrub/forest eco-tones at least 500 meters away but within 5000 meters of the park road. The study areas will exclude all campgrounds, formalized trails, visitor facilities such as the Teklanika Rest Stop and Toklat Rest Stop, the Toklat Road Camp, and the Teklanika Gravel Pit. We expect to monitor approximately 100 nests of all species combined each year. The primary method of nest monitoring will be miniaturized time-lapse digital cameras.

**Locations:** within 3 miles of the park road from mile 7-75.

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties.

### **56. Title: Mushing for Science - Modeling Snow Dynamics in The Forgotten Season (2020-2023)**

**Description:** The goal of this project is to examine the interrelationships among topography, vegetation and snow depth in a heterogeneous mountain environment to determine how dynamic weather influences important attributes of Park ecosystems. We propose to gather snow depths and associated data within several study areas of Denali National Park and Preserve. We will access study areas by foot (skis or snowshoes) and/or with assistance from the Park kennels (mushing, ski-towing).

**Locations:** Primary observations and measurements will take place in and around previously established Central Alaska Network vegetation monitoring plots in the Rock Creek drainage, along Primrose Ridge, between the Teklanika River and Big Creek, and between Wonder Lake and the toe of the Muldrow Glacier.

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties.

### **57. Title: Replace Pit Toilets at the East Fork and Gallop Cabins**

**Description:** This project entails construction of two environmentally friendly vented vault toilets also known as SST's which are used throughout the park at the historic East Fork and Dean cabins and at the Gallop Cabin in Kantishna. The design will follow that used at two other locations in the Wonder Lake area. It will involve excavation for a 1000 gallon steel tank and the construction of an ADA accessible restroom facility with a concrete floor at both locations. The Gallop Cabin SST will be constructed, and old outhouse removed in 2020. The decision on location of the East Fork Cabin SST is on hold until other planning efforts are more complete, likely not until 2021. Updated maps will be provided at that time

**Locations:** East Fork Cabin Site and the Gallop Cabin Site.

**NHPA Assessment of Effect:** Undetermined

### **58. Title: Improve Human and Wildlife Safety by Placement of Informational Signs on The Park Road**

**Description:** In an effort to improve human safety around wildlife, informational signs will be strategically placed along the park road. The signs will provide wildlife safety messaging pertaining to maintaining proper distances and not feeding wildlife.

**Locations:** Along the Park Road to mile 32.

**NHPA Assessment of Effect:** Undetermined

### **59. Title: Close Abandoned Mine Shaft at Last Chance Mine in DENA to Improve Visitor and Wildlife Safety**

**Description:** The Last Chance Mine shaft was identified in an inventory as a visitor safety risk. The shaft is about seven to eight feet deep. The bottom five feet of the shaft are flooded, creating a water trap with three foot sheer walls from which it would be very difficult for a person to escape. The objectives of this project are to construct a permanent shaft closure that will eliminate a safety risk related to the abandoned mining feature. The preferred permanent closure method is to backfill the shaft with gravel. Concurrent with the shaft closure, non-historic, environmentally detrimental trash, such as plastics, will be removed from a historic mining cabin on the property. This project was originally scheduled for 2020 but was delayed due to the Covid 19 Pandemic.

**Locations:** Kantishna area of the Park

**NHPA Assessment of Effect:** No Adverse Effect to Historic Properties.

### **60. Title: Improve Drainage and Repair Trail Tread on the Windy 17B Easement OHV Trail**

**Description:** This project will fix several drainage issues on the NPS managed easement across private property on the Windy Creek Trail. Steep sections of the trail are getting washed out and puddles are forming and growing where water can't get off the trail. Two existing boardwalks have puddles forming at the beginning and ends, so that it can be dangerous to get an ATV on or off the structure. This project will extend the structures

through the puddles and create a sloped ramp to minimize mechanical erosion as machines get off and on the boardwalk. One 70' long puddle will be drained with a 50' long ditch and hardened using a porous pavement product backfilled with material borrowed from the ditch excavation. This project was originally scheduled for 2020 but was delayed due to the Covid 19 Pandemic.

**Locations:** Windy Creek Trail near Cantwell, AK

**NHPA Assessment of Effect:** Undetermined.

## **61. Title: Rehab Cultural Display at the Denali Visitor Center**

**Description:** The Park is proposed to rehabilitate one of the Cultural Displays in the Denali Visitor Center (DVC) in order to display a 10 ft. long bear spear on loan to the park from the Starr Family (the Starr Family wants the spear to be displayed). Work may include removing display backgrounds, installing wall and floor support mounts, redoing interp panels, make sure the protective plastic around the display is adequate to accommodate the artifact. The spear would be on display seasonally during the period of the loan in the season when the DVC is open to visitors. This project was originally scheduled for 2020 but was delayed due to the Covid 19 Pandemic.

**NHPA Assessment of Effect:** No potential to cause effect.

## **62. Title: Denali Road GPS Benchmark Recovery Campaign (2021)**

**Description:** The Denali Park Road is a critical infrastructure for access to the park, and in the past was recognized as a key element in surveying Alaska. So much so that federal surveyors installed and levelled benchmarks on the road in August 1965 correctly assuming the importance of surveying this road. Today, when road, bridge, utility, resource projects are planned, on-ground ties to geodetic control are essential elements for tying survey projects to current and future aerial data (DEM's, Orthos). Any modern survey project must rely on modern coordinates for these benchmarks. This project will leverage the 2016 benchmark recovery campaign and re-observe recovered marks using long occupation overlapping survey campaign techniques that were not used in 2016. These data will use the latest GPS gear and processing techniques to provide coordinates for all future surveying along the road corridor. Because these benchmarks were established over 50 years ago they are cultural resources and may be considered integral to the road as a cultural landscape.

**Locations:** These benchmarks are located off the road (from 5 to 150 feet from centerline; none in wilderness), invisible from the road centerline and like all places in Alaska are subject to increasing growth of shrubs and overstory that are detrimental to any future use of surveying techniques that require the benchmark to be stable and with a clear view to the sky. Knowing where these benchmarks are and maintaining the health of these control is not only of cultural significance but crucial for any future geodetic work. Protection of these marks is vital to the parks mission into the future when a new datum is released in 2025 when the X, Y and Z values of the benchmarks will change. This project intends to recover 8-15 marks from 2016 as well as other marks set by surveyors including 2019(Toklat), 2011(Stony Creek), 2011(Bridge) and 2019 (Friday Creek).

**NHPA Assessment of Effect:** No Adverse Effect to Historic Properties.

## **63. Title: Continue snow surveys in Denali as part of the Central Alaska I&M Network, (2021-2025) - PI. P. Sousanes. Renewal 2021**

**Description:** To efficiently obtain, manage, and disseminate high quality information on snow, water, climate, and hydrologic conditions. Snowpack information provides additional understanding of a large number of natural resource processes within the park including wildlife research such as population density, birth survival rates, herd movements, vegetation succession, as well as hydrologic information regarding surface water supply. This project started as part of Denali National Park and Preserve's Long Term Ecological Monitoring (LTEM) Program and has continued since 2002 as part of the Central Alaska Inventory and Monitoring Network (CAKN). The snow surveys involve two methods of data collection, one is a ground-based survey and the other is an aerial survey. These surveys are done as part of an interagency agreement with the USDA Natural Resources Conservation Service (NRCS).

The ground-based survey is done at an established snow course, where there are five permanent markers installed in the ground. There are four of these in/near the park at: park headquarters, Kantishna, Minchumina, and Purkeypile Mine. The latter three are near remote airstrips. Three times per winter (Feb. 1, Mar. 1, and Apr. 1) a field crew will visit the sites and take snow measurements, including snow depth, density, and snow water equivalent, using a cylindrical snow tube. Access to the site requires a fixed-wing aircraft with skis or wheel/skis and then a short ski or snowshoe to the site.

The aerial surveys require low level passes with a fixed-wing aircraft to read the snow depth at an established snow marker, which is a 10-12 foot pole with alternating red and black crossbars spaced one foot apart. There are six snow markers on the south side of the Alaska Range in Denali at Dunkle Hills, Tokositna Valley, Ramsdyke Creek, Dutch Hills, Nugget Bench, and Chelatna Lake. There are also aerial markers at Kantishna and Purkeypile for those times when conditions prevent the plane from landing at the airstrip (aufeis, wind, daylight, etc.). These surveys are also done three times per winter often at the same time as the ground surveys. The snow survey window is the last three days of the month through the first two of the next month, i.e. the February 1 survey window is January 29-Feb 2.

**Locations:** There are four existing snow courses on the north side of the Alaska Range and six aerial snow markers on the south side of the Alaska Range. These sites were established in the 1980s and 1990s and have been measured continuously for several decades.

**NHPA Assessment of Effect:** No Adverse Effect to Historic Properties.

#### **64. Title: Continue weather and climate monitoring in Denali NP&P as part of the Central Alaska I&M Network (2021-2030)**

**Description:** To continue the long-term climate monitoring efforts in Denali. Climate patterns are key to understanding ecosystem processes, yet the available analyses, trends, and models for Alaska are based on relatively few observations. One of the fundamental ways the Central Alaska Network is helping to assess climate change is by operating remote climate stations that continuously record temperature, precipitation, wind speed and direction, soil temperature, relative humidity, snow depth, and solar radiation, throughout the park. These climate stations are providing critical quantitative data for current and future research and management decisions. The objective of the climate monitoring program is to monitor and record weather conditions at representative locations in order to identify long and short-term trends, provide reliable climate data to other researchers, and to participate in larger scale climate monitoring and modeling efforts beyond park boundaries.

Summary of proposed field methods and activities:

There are six climate stations in the park that were installed in 2004 and 2005 with long-term monitoring as the goal. It is important to maintain the stations so that they will continue to collect the data we need. An annual site visit to each station in the summer allows us to download the data, calibrate and swap out sensors, and troubleshoot any problems. Two sites are accessible along the park road (Toklat and Eielson Visitor Center),

while the four additional sites are in more remote locations and require access by air (Stampede, Wigand, Ruth Glacier, and Dunkle Hills). Details related to the selection of the sites, the process for data collection, the station design, data processing, and data dissemination are documented in the Central Alaska Climate Monitoring Protocol and Standard Operating Procedures: Sousanes PJ. 2018. Climate monitoring protocol for the Central Alaska Network: Denali National Park and Preserve, Wrangell-St. Elias National Park and Preserve, and Yukon-Charley Rivers National Preserve, Version 1.01. Natural Resource Report. NPS/CAKN/NRR—2018/1599. National Park Service. Fort Collins, Colorado. Available at: <https://irma.nps.gov/DataStore/Reference/Profile/2251883>.

**Locations:** The six CAKN climate stations are located at Toklat, Eielson Visitor Center, Dunkle Hills (above the old mine site), Ruth Glacier (in the Tokosha Mountains above Ruth Glacier) Stampede Airstrip, and Wigand Creek (in the Toklat basin just north of the wilderness boundary near the confluence of the Toklat and East Fork of the Toklat). The locations of the sites we maintain in cooperation with others are: Fire RAWs: McKinley River (near Hot Slough), Wonder Lake (at the WL Ranger Station), Denali Visitor Center RAWs near the park entrance., and Minchumina NRCS Snotel: Kanitshna (just north of the Denali Backcountry Lodge) and Tokositna Valley (at the confluence of Ramsdyke Crekek and the Tokositna River). NOAA CRN: Denali 27N located above the Wonder Lake campground on the service road near the water tower. NWS COOP site: McKinley Park at the kennels /park headquarters and at Eielson VC (co-located with CAKN station). Denali Mountain sites: At 7K and 14K camps on Denali.

**NHPA Assessment of Effect:** No Historic Properties Affected

## **65. Title: CAKN Permafrost Monitoring in Denali National Park and Preserve (2021-2031)**

**Description:** The purpose of this proposal is to initiate long-term monitoring of the thermal and physical state of permafrost within DENA while also building on previous research campaigns. The CAKN permafrost monitoring program aims to focus on three main field sites: -Toklat Basin: active layer thickness and soil surface elevation were measured at six transects in the Toklat Basin in 2013 (Reitman and Schirokauer, 2013). These transects (or a portion thereof) will be repeated as part of this program. -Gosling Lake: permafrost degradation between burned and unburned areas near Gosling Lake has been studied through field campaigns in 2005 and 2019. This program will repeat active layer thickness measurements, elevation surveys, and download temperature dataloggers from the site. (See PEPC 87051 for previous compliance completed for work at this site) -DENA Park Road: It is proposed that two long-term monitoring grids be established at Wonder Lake and Murie Flats to measure active layer thickness, soil surface elevation, and soil temperature. As part of the CAKN program, these sites will be remeasured every 3 years. Because this is long-term monitoring through the CAKN program, we would like to request a 10-year permit.

**Locations:** Six sites listed above

**NHPA Assessment of Effect:** No Historic Properties Affected.

## **66. Title: Install A New NADP Collector at The Denali NP&P Air Quality Monitoring Site**

**Description:** The Denali air quality monitoring station has been operating continuously since 1980, when a National Atmospheric Deposition Program (NADP) precipitation collector was installed near the water treatment/water reservoir building at park headquarters. The original collector is still operating, but the NADP network is currently replacing the old collectors with a new model at all 263 sites nationwide. In order to ensure

data continuity, the old and new collectors should be co-located for one to five years, in close proximity without violating any of the network siting criteria.

**Locations:** Headquarters area of the Park

**NHPA Assessment of Effect:** No Adverse Effect to Historic Properties.

## **67. Title: Spruce Beetle Population Monitoring (2021-2025)**

**Description:** A spruce beetle outbreak in Southcentral Alaska has moved swiftly through the forests of the region since its initial detection in 2016, impacting many aspects of life including infrastructure, safety, recreation, and tourism. Trapping within Denali National Park and Preserve would consist of one to three Lindgren funnel traps, which are a standard tool for bark beetle monitoring. Trap locations would be flagged for ease of collection. Traps would be installed around May 1 and preferably checked at 2-week intervals through early September, at which point all traps, flagging, or any other trap-related items would be removed.

Traps are baited with a spruce beetle lure and the collection cup at the bottom of the of the funnel set will either be filled with propylene glycol (wet trapping - preferred) or have a Vapor Tape II insecticide strip placed in it (dry trapping). If possible, the traps are placed approximately a tree length from the nearest host trees to avoid localized spillover attacks from beetles coming into the traps; these traps only draw in beetles in the general vicinity. All propylene glycol or pesticide strips used during the trapping will be removed from the field. Lures may or may not need replaced during the season (manufacturer-dependent). Collections will be stored in Ziplock bags in a freezer until they can be sorted and counted. Traps will be installed by AKDOF staff and maintained by AKDOF or Federal cooperators.

**Locations:** Front Country. Specific locations to be determined after consultation with Denali National Park and Preserve staff.

**NHPA Assessment of Effect:** No Adverse Effect to Historic Properties.

## **68. Title: High-Altitude Cognition and Electroencephalography on Denali (2021)**

**Description:** The purpose of this study is to further our understanding of how the human brain, particularly the cerebral cortex, functions in high-altitude environments, and how altitude-induced changes in cortical activity underlie cognitive and behavioral changes observed at high elevation in numerous research studies and in reported in myriad anecdotal accounts. In Phase 1 (May-June 2021), researchers will observe a limited sample of participants from their own climbing team, to test wearable EEG recording equipment's functionality at altitude and in cold environments, computational needs for data recording and storage, and battery power and solar needs for future research (Phase 2). Participants' EEG brain waves will be measured with 1) eyes open and 2) eyes closed for 128 seconds in each condition, at various elevations while ascending and descending Denali. In Phase 2 (May-June 2022), researchers will recruit a group of volunteer participants who have registered to climb Denali. Participants will be given the above-described eyes open/eyes closed task, in addition to the Attention Network Task (ANT; Fan, McCandliss, Sommer, Raz, & Posner, 2002), which measures the separable alerting, orienting, and executive attentional systems of the human cognitive system via reaction times on a simple, well-normed, computerized test which takes approximately 10 minutes to complete. For safety and comfort, testing will be administered in well-established camps on the mountain, and during climbers' rest days to minimize disruption of their climbing schedules. EEG and other physiological measures, including heart rate and oxygen saturation will be recorded. All data collection will be conducted in accordance with protocols approved by the Institutional Review Board (IRB) at Westminster College and with local public health and safety protocols.

**Locations:** Basecamp (7,200'), Camp 2 (11,000'), Camp 3 (Genet Basin, 14,200') on the West Buttress climbing route.



**NHPA Assessment of Effect:** No Historic Properties Affected.

### **69. Title: Replace Log Retaining Wall and Repair Turnpike on Roadside Trail**

**Description:** The existing 300' retaining wall is failing and is in need of repair. The existing wall is a vertical wall built with a soldier pile design and due to its near vertical design the wall is leaning out and rotting, causing the edge of the tread to be weak and unstable. Retaining wall is to have dead-men every 8' or as needed. Existing wall will be removed and disposed of and all impacted area to be re-habilitated. Wall is located about 1/2 mile east of the c-camp turn off from the park road. Wall is failing due to the small diameter material and wood rot, because of wood rot nails are failing to hold. The existing wall was built in 1987ish out of spruce logs, and soldier pile construction. We propose common log retaining wall built with heavy batter and allow logs to rot in place and covered with soil and vegetation allowed to grow, this will eventually become an earthen wall that should never need replaced. Repair ~150' of gravel turnpike with log bound turnpike. The existing turnpike is imported gravel with steel culverts. This work will bind the turnpike for the length of the walking surface with treated logs to contain the material and to allow for cross drainage. Steel culverts will be removed.

**Locations:** Roadside trail at the entrance are of the Park

**NHPA Assessment of Effect:** No Historic Properties Affected.

### **70. Title: Document and Monitor The 2021 Muldrow Glacier Surge Event (2021-2022)**

**Description:** The Muldrow Glacier is surging. In order to further the scientific understanding of this very large surge-type glacier, document the event as a key, highly-dynamic feature within the Denali Wilderness, and share this event with current and future generations of park visitors (including virtual visitors), park staff will temporarily deploy on-the-ground monitoring equipment on or near the glacier including: 1) 2-6 time lapse cameras, 2) 2 survey grade GPS units, 3) a sound monitoring station, and 4) a stream gauge. Equipment could be located anywhere throughout the lower Muldrow (or Peters basin; see Muldrow Glacier Surge Study Area map) that offers the best opportunity to safely capture measurements of the surge. Due to the dynamic nature of this event, the exact locations cannot be determined until areas are closely examined from a helicopter; thus, field staff will make on site determinations on the locations of monitoring equipment. Most of these sites can only be safely accessed by helicopter due extreme crevassing and other terrain features. The only ground disturbance will be stakes (less than 2" in diameter) used to secure the monitoring equipment. The potential site for the sound monitoring station and the stream gauge can be accessed on foot once the Denali Park Road is open to administrative traffic. The on-the-ground equipment would be removed by September 30 2021 but could be re-deployed in spring 2022 if the surge event reoccurs. In addition to the ground-based data collection campaign, several airborne imaging (structure from motion) missions are planned along with a satellite (DigitalGlobe) tasked to capture images of the Alaska Range in Denali.

**Locations:** Muldrow and Peters Glacier

**NHPA Assessment of Effect:** No Historic Properties Affected.

### **71. Title: NSF EAGER: Collaborative Research: Mantle Fluid Contribution to Springs Along the Denali Fault System: Constraints on The Crustal Scale Nature of The Main Strand and Splays**

**Description:** The overarching purpose of this study is to use the water composition and helium isotope geochemistry of cool and warm springs located along the Denali Fault system (DFS) to address fundamental unknowns about the nature of this fault zone at depth. For this study we will target at least 10 fault-related and/or travertine-depositing springs associated with the Denali Fault system. One of these springs is located near Windy Creek within the Denali National Park and Preserve. This spring will be accessed by foot. Field work will take less than one day so there will be no camping. Springs will be sampled at their source for major and trace element chemistry, carbon stable isotope ratios of dissolved and free gas, H and O stable isotope ratios in water, and helium isotope ( $^3\text{He}/^4\text{He}$ ) ratios.

**Locations:** Spring near Windy Creek, Cantwell, just 1/2 within park boundary.

**NHPA Assessment of Effect:** No Adverse Effect to Historic Properties.

## **72. Title: Minor Repair and Routine Maintenance to Stony and Sanctuary Bridges**

**Description:** Stony Creek Bridge work includes: 1. Replacement in kind of concrete bridge decking. Concrete bridge joint repair and reconstruction includes applying a bonding coat of an epoxy resin adhesive to the surfaces of the sound existing concrete immediately before placing new elastomeric concrete. 2. Expanding the scuppers (deck drains) by one foot. Scuppers will be painted to match the bridge. See image attached. 3. Adding Class 2 riprap to the southeast abutment. Riprap will be provided by NPS and come from the Toklat. Sanctuary River Bridge work includes repairing concrete bridge joints similar to Stony Creek and painting steel bridge rails. See drawing attached.

**Locations:** Stony and Sanctuary Bridges on the Park Road

**NHPA Assessment of Effect:** No Adverse Effect to Historic Properties.

## **73. Title: Toklat #1 Riprap and Sheet Pile Extension - Toklat Bridge Repair**

**Description:** Toklat #1 Bridge has the need for attention due to abutment erosion on the western side. This project has evolved over several years. The east end abutment of the bridge currently has sheet piling from the original construction in the 1980's. This will remain in place, and 266 additional feet will be added on the south side of the bridge. Sheet pile will be driven 20' deep and be exposed 6-8' feet to match the existing sheet pile. It will not be galvanized, so weathering will occur within a season to match existing sheet pile. Additionally, class 5 riprap will be placed along the entire length of the sheet pile. The riprap will be placed at an angle that matches the existing slope of the causeway. The combination of sheet pile and riprap will protect the bridge and causeway while further discussion over the future of the Toklat bridges and causeway continue. The removal of the causeway and bridges at Toklat will be a mega project with long timeline and therefore we need to ensure the current infrastructure continues to function in the foreseeable future. Installation of sheet pile will include use of a vibratory piledriver over the course of 10 days. A visual showing the impact to the soundscape is attached. Heavy equipment will need to access the river bar to create a temporary berm, complete pile driving, and place rip rap. Project is expected to occur between May and September of 2021.

**Locations:** Toklat River Bridge

**NHPA Assessment of Effect:** No Adverse Effect to Historic Properties.

## **74. Title: FY21 Process Toklat River Scrape Material**

**Description:** This project will provide processed mineral materials for planned repair projects and maintenance on the Denali Park Road. Contract processing of gravel will take place at the Toklat pit and result in making up to 22,200 cubic yards of road repair and maintenance material available. Material produced from government

provided pit run will be 3 inch minus (select borrow- -8,000 cubic yards), 1 inch minus with bentonite (road surfacing- -12,000 cubic yards), and 1 inch minus without bentonite (road and drainage- -2,200 yards). The majority of the road surfacing material will be mixed with approximately 1.25% bentonite to meet FHWA specifications. Material production costs include equipment mobilization and de-mobilization and are based on processing material with a concurrent contracted road repair project for economy of scale. Processing equipment mobilization and demobilization is expected to be a large portion of this project.

**Locations:** Toklat River/ Camp

**NHPA Assessment of Effect:** No Potential to Cause Effect to Historic Properties

## **75.Title: Install Heat Recovery Ventilation Units in Six Permanent Park Residences**

**Description:** This project will install Heat Recovery Ventilation (HRV) units and all duct work and associated controls in six park residences (Buildings 26, 27, 28, 34, 111 and 171), five of which are historic and all of which are in the Denali Headquarters Historic District. Work will also include any necessary modifications to the interior structure of the residences to accommodate the duct work and the HRV units..

**Locations:** Denali Headquarters Historic District

**NHPA Assessment of Effect:** No Adverse Effect to Historic Properties.

## **76.Title: Modification to Oxbow Trail upgrades**

**Description:** This project will upgrade the Oxbow Trail to meet accessibility guidelines in conjunction with the development of the new trailhead at MP 231of the Parks Highway. In planning for the project, several changes from previously-approved actions have been identified that will ensure the project meets accessibility requirements and makes for the most efficient implementation of the trails plan for the area. These changes from previous approvals include the following, and are shown in the attached map:

- Make trail connections to the parking lot that align with current AK DOT plans, including establishing the trailhead at the eventual parking area and aligning the trail access through the proposed driveway until the parking area is constructed
- Alter the trail alignment for a total of approximately 1,000 feet to meet accessibility requirements, avoid confusion and congestion at trail junctions, and to avoid unstable slopes on the narrowest part of the oxbow

**Locations:** Area north of at MP 231of the Parks Highway

**NHPA Assessment of Effect:** No Adverse Effect to Historic Properties.