ENVIRONMENTAL ASSESSMENT

FOR INSTALLATION OF A CLIMATE REFERENCE NETWORK STATION AT WONDER LAKE DENALI NATIONAL PARK AND PRESERVE

Prepared by
United States Department of the Interior
National Park Service
Denali National Park and Preserve

April 2014

Comments on this EA should be submitted to the project website at:
http://parkplanning.nps.gov

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PURPOSE AND NEED

The National Park Service (NPS) is considering a proposal by the National Oceanic and Atmospheric Administration (NOAA) to install a US Climate Reference Network station near the water treatment building west of the Wonder Lake Campground in Denali National Park and Preserve (DENA) (Figures 1-4). The site is within an area excluded from wilderness designation and would not be visible from the campground.

The U.S. Climate Reference Network (USCRN) is a network of climate stations developed, deployed, managed, and maintained by NOAA in the United States for the express purpose of detecting the national signals of climate change. There are currently 114 stations that have been deployed in the lower 48 states, and 14 stations in Alaska, including sites in Lake Clark National Preserve and Katmai National Park. The station is needed in DENA both to locate a station in this part of Alaska and because a site within a national park has the least likelihood of anthropogenic landscape change.

This Environmental Assessment (EA) analyzes a No Action Alternative and one action alternative for installing a climate monitoring station within Denali National Park and Preserve and has been prepared according to the National Environmental Policy Act of 1969 and regulations of the Council of Environmental Quality (40 CFR 1508.9).

Background

Over one hundred years ago the National Weather Service, a branch of NOAA, established the Cooperative Weather (COOP) station network. The McKinley Park COOP site, located at park headquarters, is part of this network and has provided consistent park weather and climate data since 1925, and is now one of the most valuable long-term records of climate in the state. The US CRN program is the next generation of these sites, with a sophisticated new standardized set of climate stations that span the country. The vision of the USCRN program is to maintain a sustainable high-quality climate observation network that 50 years from now can with the highest degree of confidence answer the question: How has the climate of the nation changed over the past 50 years?

In many areas of the U.S., urbanization and land clearing has confounded long-term climate records. It has been found that landscape change has the greatest influence on localized climate change, and the national parks are seen as providing some of the most stable environments, least likely to be affected by anthropogenic landscape changes.

NOAA and DENA staff have been searching for an acceptable site for a CRN station in DENA for almost 10 years. Sites around the headquarters area, Toklat, Summit Airstrip, Dunkle Hills, Purkeypile, and Wonder Lake have been looked at. Most of the sites were not approved by the

NOAA team. The latest proposed site, located off of the service road west of Wonder Lake campground was recommended by the park in 2012, surveyed during the summer of 2013, and was approved by the NOAA team in November 2013. If approved, the CRN site would be installed and maintained by NOAA.

There are currently ten weather stations in DENA, including the old COOP station at park headquarters. Remote Automated Weather Stations (RAWS), which send real time weather data to monitoring stations via satellites, have been established at the Denali Visitor Center (2005), Eielson Visitor Center (2008), Toklat Road Camp (2005), Wonder Lake Ranger Station (1995), Wigand Creek (2013), Stampede Airstrip (2007), Dunkle Airstrip (2000), Tokosha Mountains (1995) and McKinley River (1988). These weather stations and a snow telemetry site is in Kantishna (1990) are all maintained by the NPS. A limited weather station sponsored by the University of Alaska is slated for the 16,200 foot level on Mt. McKinley in 2014.

The Denali Park Road was constructed from east to west, starting in 1922, and reached the Wonder Lake area by 1936. The Wonder Lake Ranger Station was constructed by the Civilian Conservation Corps in 1939 and small cabins and other support structures have been added through the years. A RAWS was placed near the Ranger Station in 1995 to replace a standard thermometer instrument hut and to advance to real-time weather data from that area.

A spur road to access the south end of Wonder Lake was constructed in 1936, and a formal campground was constructed on a small knoll south of the lake in 1954. Air photos taken in August, 1952 show an extension of the lake spur road heading uphill west and north to a turnaround loop. This spur road extension was 2/3 of a mile long and provided access to a large pond which came to be used as a water source for the campground. The pond water was pumped into a 10,000 gallon tank, which then supplied water downhill (gravity pressure) to the campground through a pipe set on the ground.

In order to allay concerns about *Giardia* in the pond water supplied to the campground, a new well was drilled near the south end of Wonder Lake in the late 1970s and enclosed in a pumphouse. The water supply road was extended another 400 feet to site closer to the campground for a new water tank. The well water was then pumped up to the new tank, chlorinated, and then gravity fed back to the campground. A new well was drilled next to the water tank in 2011, and a new pump house was built near the tank. The well and pump house next to the lake has been abandoned.

Private vehicles have generally not been allowed to travel to the Wonder Lake Campground since 1987, so traffic on the water tank road is usually not more than one maintenance trip per day during the summer season.

Park Purpose and Significance

On February 26, 1917, Congress established the original Mount McKinley National Park as "… a public park for the benefit and enjoyment of the people… said park shall be, and is hereby established as a game refuge" (39 Statute 938). In 1922 and 1932 subsequent legislation expanded the park boundaries to the east and north, including lands in the Wonder Lake area, for the purpose of protecting winter game habitat, especially for moose.

The Alaska National Interest Lands and Conservation Act of 1980 (ANILCA) added approximately 2,426,000 acres of public land to Mt. McKinley National Park and approximately 1,330,000 acres of public land as Denali National Preserve and re-designated the entirety Denali National Park and Preserve. ANILCA Title I recognizes that the purposes for the Alaska conservation system units includes their preservation "for the benefit, use, education, and inspiration of present and future generations certain lands … that contain nationally significant natural, scenic, historic, archeological, geological, scientific, wilderness, cultural, recreational, and wildlife values…." Furthermore, it was the intent of Congress to, "… maintain opportunities for scientific research and undisturbed ecosystems."

Section 701 (1) of ANILCA established the Denali Wilderness of approximately 1.9 million acres (since re-mapped at 2.1 million acres), which is basically all of the former Mount McKinley National Park minus the park entrance area, road corridor to the old boundary near Wonder Lake, various development nodes along the road corridor, and all of Wonder Lake and nearby lands.

Legal Context

The National Park Service Organic Act of 1916 (16 USC §§ 1-4, 39 Stat. 535) established the National Park Service and directs the agency to:
"…promote and regulate the use of the Federal areas known as national parks, monuments, and reservations… by such means and measures as conform to the fundamental purpose of the said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

The NPS Organic Act and the General Authorities Act of 1970 prohibit impairment of park resources and values.

The 1966 National Historic Preservation Act (NHPA), as amended, provides direction to federal agencies for protection of historic resources. Section 106 of the act requires consideration of adverse impacts to historic resources during the course of any federal undertaking. Section 110 provides for an affirmative role of federal agencies in identifying, preserving, and utilizing the historic properties that are in agency ownership.

The 2006 NPS Management Policies use the terms "resources and values" to mean the full spectrum of tangible and intangible attributes for which the park is established and managed, including the Organic Act's fundamental purpose and any additional purposes as stated in the park's establishing legislation. The impairment of park resources and values may not be allowed unless directly and specifically provided by statute. The primary responsibility of the NPS is to ensure that park resources and values will continue to exist in an unimpaired condition that will allow people to have present and future opportunities for enjoyment of them.

Issues Considered for Evaluation

To focus the EA, the NPS selected specific issues for further analysis. Discussions of the affected environment and environmental consequences related to each alternative focus on the selected issue topics. A brief rationale for the selection of each issue is given below.

Effects on Vegetation, Wetlands and Soils
The project could result in the disturbance of plots of shrubby vegetation where instruments are installed.

Effects on Wildlife and Habitat
Some wildlife habitat would be excluded for use by large mammals.

Effects on Cultural Resources
Cultural resources could be affected. A new site would have reviews and clearance pursuant to Section 106 of the 1966 National Historic Preservation Act.

Effects on Visitor Use and Aesthetics
There could be an impact on the experience of Wonder Lake Campground users.

Effect on Park Operations
Operation of the station would require some attention from park staff.

Issues Dismissed from Further Evaluation

These topics were considered but dismissed from further evaluation because of the reasons provided below.

Endangered, Threatened, Species of Special Concern
There are no known threatened and endangered species or their habitat at the proposed site.

Floodplains
The site would not be located in floodplains.

Natural Soundscape
Construction of the station would have a negligible effect on natural soundscape. Operation of the station would have no impact on natural soundscape.

Air Quality
Use of a small methanol fuel cell to recharge batteries would have negligible impacts to air quality. The fuel cell emissions consist of a small amount of water vapor and carbon dioxide.

Wilderness
The project area has been identified as not eligible for wilderness designation.

Minority and Low-Income Populations
Executive Order 12898 requires federal agencies to incorporate environmental justice into their missions by identifying and addressing high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The proposed project would not result in disproportionately high direct or indirect adverse effects on any minority or low-income population or community.

Subsistence Resources and Uses
No significant impact or restriction to ANILCA subsistence uses or resources is anticipated as a result of establishing a weather station near Wonder Lake. The impacts to subsistence of the proposed action as well as the no-action alternative are discussed more fully in the ANILCA Section 810 evaluation, which is included as Appendix A of this EA.

Local Communities/Socioeconomic Resources - Construction activities and costs associated with the proposed project would provide a negligible stimulus to the local or regional economy.

Permits and Approvals Needed to Implement the Project

A concurrence from the State Historic Preservation Officer would be required for the Assessment of Effect of this project on cultural resources. The park is seeking a conditional "No Adverse Effect" determination in its Section 106 compliance for the proposal.

The project would qualify for a Section 404 Nationwide Permit #5, Scientific Measurement Devices, from the Corps of Engineers. Use of this permit does not require notification of the Corps or further action.

The project is excepted from NPS Wetlands Statement of Findings and compensation requirements because the impact covers less than 0.1 acres and is classified as an installation of scientific measuring devices.

ALTERNATIVES

Alternative 1 – No Action

Under the No Action alternative, no Climate Reference Station would be constructed at the end of the Wonder Lake Campground water tank road. There would be continued use and maintenance of the RAWS near the Wonder Lake Ranger Station.

Alternative 2 – Climate Reference Station near the Wonder Lake Campground (NPS Preferred Alternative)

A 4-season Climate Reference Station would be installed on a level bench (see Figures 3 and 4) about 150’ east of the water tank road and about 300 feet southeast of the water treatment building for the Wonder Lake Campground (see Figure 2). Installation would involve excavation of two 3’x3’ areas 2 ½ feet deep into mineral soil to install concrete foundations for a weather tower and rain gauge. The rain gauge would be surrounded by a 10' diameter wind screen. The entire area (approximately 25' x 25') may be surrounded by electric fencing to protect equipment from large mammal interest. The fencing would be suspended on t-posts, driven 2 feet into the ground. Solar panels, wind generators, and/or fuel cells would be used to power the station. The largest power draw would be from the aspirated shields around the temperature sensors and the heating element on the rain gauge. The meteorological instrument tower would be 20 feet tall to meet standards for reporting fire weather. Soil moisture instrumentation would be placed in 5/8 inch holes to 3 feet deep and ground fuel (duff) moisture probes would be used. Wires connecting instruments to the power supply and computer would be buried in the top of the mineral soil.

Methanol fuel is toxic, but the 8 gallons of methanol would be stored along with the batteries, water, and fuel cell in a large insulated shipping container (3’x4’x3’), which would contain any potential spill. Installation and site preparation costs would be assumed by the USCRN. Installation could occur as early as 2014. An example of an existing CRN station (without a 20’ tower) is shown in Figure 5.

After a year or so of reliability testing and comparison with data from the RAWS at the Wonder Lake Ranger Station, that RAWS would be removed and would be functionally replaced with the data from the new CRN station.

Environmentally Preferable Alternative

Alternative 2 would be the environmentally preferred alternative because the highly visible RAWS would be removed from its location along the park road and near the historic Wonder Lake Ranger Station and would be replaced by a much less visible climate station along the campground service road. The impact to the natural environment from using either site for weather equipment is negligible.

Figure 1
Proposed Wonder Lake Weather Station

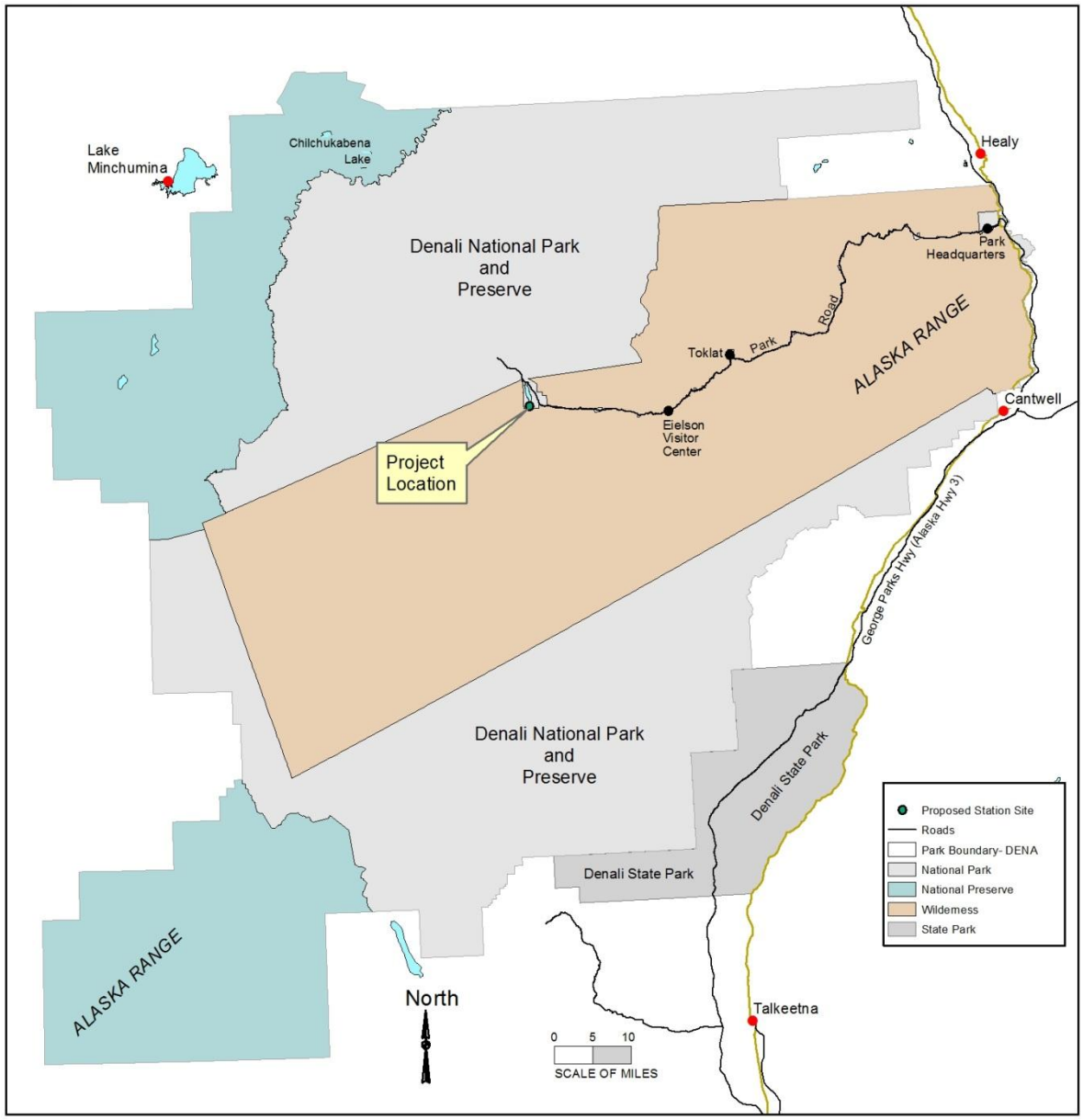

Figure 2
Proposed Wonder Lake Weather Station

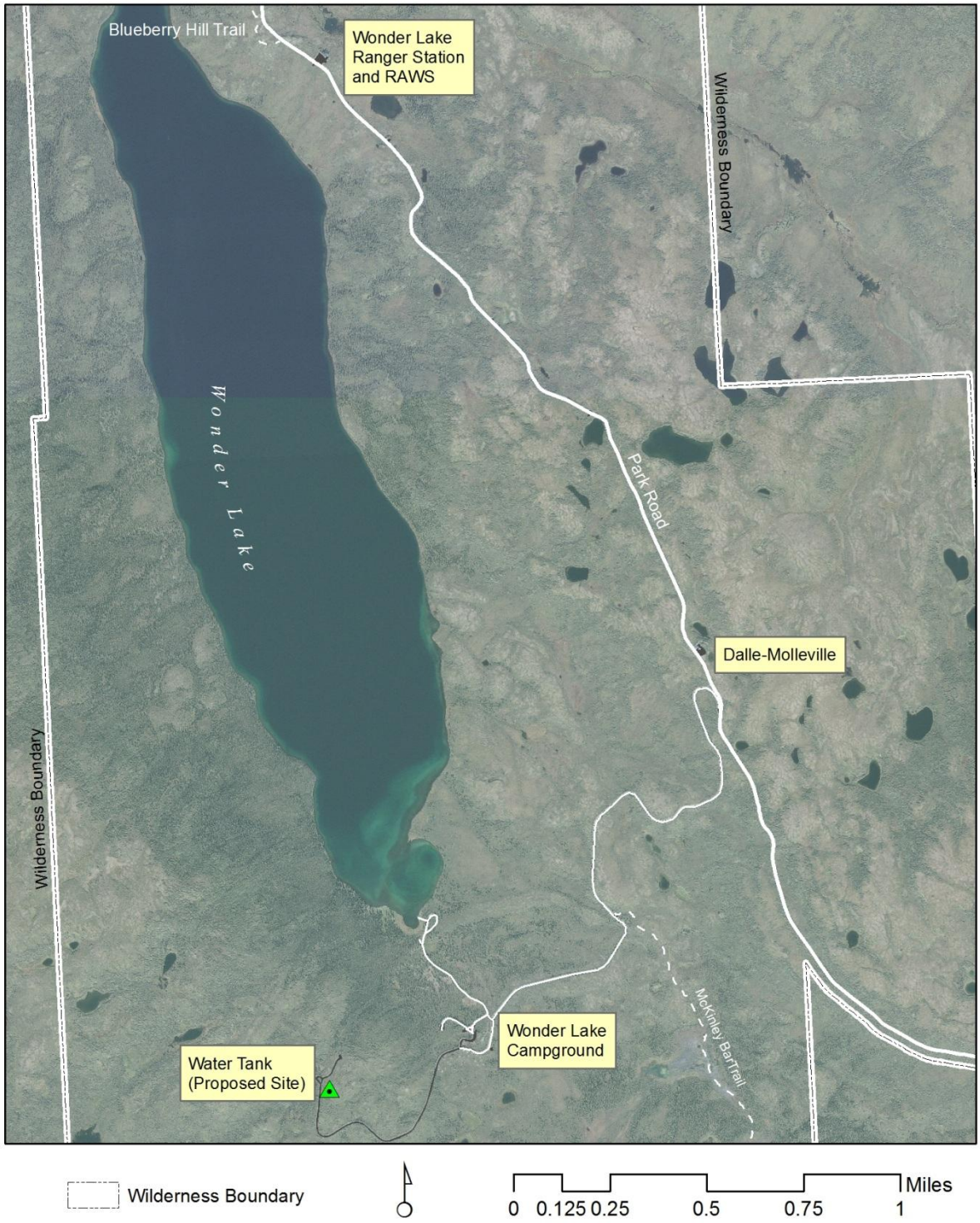

Figure 3
Proposed Climate Reference Network Site

Figure 4
Proposed Climate Reference Network Site

Figure 5
Similar Equipment Set-up at Gustavus, Alaska

Mitigation and Monitoring

Mitigations are specific actions that reduce impacts, protect park resources, and protect visitors. The following mitigations would be implemented with the project and were assumed in the analysis of effects.

Permits – A research permits would be issued to NOAA-USCRN for five years, renewable upon a detailed project review. A Research Permit details the permitted station location, limits of installation, and use of the NPS facilities. The Research Permit would require annual investigator reports. The fuel cell and fuel would be housed within a larger container to prevent a fuel spill from reaching the ground.

Wildlife – Vegetation clearance guidelines from the Migratory Bird Treaty Act would be followed while setting up the climate station. A list of best management practices for using portable electric fences around park research installations would be mandated for NOAA to use at this site.

Cultural Resources – The site would be visited and surveyed for cultural resources prior to the installation of the station. If during construction, previously unknown archaeological resources were discovered, all work in the immediate vicinity of the discovery would be suspended until the resources could be identified and documented and, if the resources cannot be preserved *in situ*, an appropriate mitigation strategy would be developed in consultation with the State Historic Preservation Officer (SHPO) in accordance with NHPA and its implementing regulations (36 CFR 800.13). The Native American Graves Protection and Repatriation Act (NAGPRA) requires that if inadvertent discovery of Native American Remains or Objects occurs, activity must cease in the area of discovery, a reasonable effort made to protect the item(s) discovered, and immediate notice made to the Superintendent, as well as the appropriate Native American group(s)and SHPO.

Visual Resources - The equipment and towers would be painted to blend in with the site and reduce any potential visibility from the park road.

Park Operations – The Wonder Lake Ranger Station RAWS would be removed after a year of successful operation of the new station when park management is assured that data from the new station is comparable to the weather data from the RAWS.

Table 1 – Summary of Alternatives

Actions	Alternative 1 – No Action	Alternative 2 – New Climate Station near Wonder Lake
Install New Climate Reference Network Station	No	Yes
Remove Ranger Station RAWS	No	Yes.
Add Soil temperature and Ground Fuels Monitoring Instruments to installation.	No	Yes
Costs to NPS	None	Less than $1,000 for monitoring NOAA setup.

Table 2 – Summary of Impacts

Impact Topic	Alternative 1 – No Action	Alternative 2 – New Climate Station near Wonder Lake
Vegetation, Wetlands and Soils	No impact	Disturb up to 625 square feet with negligible impact
Wildlife and Habitat	No impact	Negligible impact
Cultural Resources	No additional impact	Minor beneficial from removing RAWS from Ranger Station area. Potential adverse impact on unknown archeological resources.
Visitor Use and Aesthetics	No additional impact	Minor beneficial from removing RAWS from Ranger Station area. Negligible adverse from new installation near campground facilities.
Park Operations	No impact	Negligible adverse impact on park operations from the potential for the need for additional staff time and a negligible beneficial impact from having more extensive climate and soils data from the area.

ENVIRONMENTAL CONSEQUENCES

This section describes the methods and assumptions used to analyze impacts for issues and resource topics. The analysis assumes mitigation measures would be followed for both action alternatives.

Cumulative Impacts

A cumulative impact is an impact on the natural or human environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency, organization, or person undertakes such other actions (40 CFR 1508.7). Cumulative impacts can result from individually minor and insignificant, but collectively significant actions, taking place over a period of time. Cumulative impacts were assessed by combining the potential environmental impacts of the alternatives with the potential impacts of known projects that have occurred in the past, are currently occurring, or are projected to occur in the future within the region. Known past, current and reasonably foreseeable future projects and actions in the vicinity of the project site are described below.

Past and present facilities around the south end of Wonder Lake include the 30 site campground. Also within the campground is a host trailer site, a trailer site for park bus drivers and a camp for a park trail worker crew. The campground is reached by a one mile long spur road off of the park road, and a shorter road leads from the campground down to the south end of the lake, where a late 1970s abandoned well and well house will be removed in 2014. A service road extends up to the present campground well, water tank and water treatment building, and a pipe buried in the service road brings the water down to the campground. Numerous social trails radiate out from the campground in all directions, and the maintained two mile-long McKinley Bar trail takes off southward from the campground spur road.

Along the east side of Wonder Lake and above in elevation is the Denali Park Road. Two hundred yards north of the campground spur road intersection is Dalle-MolleVille, a leveled former gravel source that has a shop for the Buildings and Utilities staff plus two small housing cabins that are used by maintenance staff in the summer and the dog mushing concessioner during the winter. About ½ mile north is the Wonder Lake Ranger Station, built in 1939, that is used by patrol rangers in summer and has on site three small housing cabins and a generator shed and a pumphouse. The cabins are also used by staff in the winter while on dogsled patrols. 100 yards north of the Ranger Station is a RAWS on open tundra about 80 feet from the park road. A maintained hiking trail takes off from near the Ranger Station to the north end of the lake. Two pit toilets are the only remaining structures near the north end of the lake. There are no facilities along the west side of Wonder Lake.

The Wonder Lake Ranger Station has been determined eligible for and the park road and campground access road have been nominated to the National Register of Historic Places. The campground and water tank access road are historic in age and likely eligible for the National Register.

Alternative 1 – No Action

Effects on Vegetation, Wetlands and Soils
There would be no impact on vegetation, wetlands and soils.

Effects on Wildlife and Habitat
There would be no impact on wildlife and habitat.

Effects on Cultural Resources
There would be no additional impact on cultural resources.

Effects on Visitor Use and Aesthetics
There would be no impact on the experience of Wonder Lake Campground users. There would be a continuing negative aesthetic impact to visitors on the park road from the shiny RAWS near the Ranger Station.

Effect on Park Operations
There would be no impact on park operations.

Cumulative Effects: The existing facilities around Wonder Lake, including the campground and access roads, park road, and Ranger Station complex, have affected about 13 acres of low and tall shrub vegetation and related wildlife habitat. The park road is being nominated for the National Register of Historic Places, the Ranger Station is eligible, and the campground and service road are likely eligible. The visitor experience has benefited from the access the park road provides, having hiking trails near both ends of the lake and from having a campground near the lake with an impressive view of Mt. McKinley. Park operations have benefitted from having a Ranger Station and related housing and shops for both summer and winter operations.

The cumulative effects on cultural resources are negligible. Most of the facilities that have been developed around Wonder Lake are old enough and important enough to be either on or eligible for the National Register, and are being preserved according to prescribed treatments. The RAWS, however, is a visible intrusion alongside the cultural landscape of the park road and Wonder Lake Ranger Station. The cumulative effects on visitor use have been moderately beneficial from the campground and trail development, and the cumulative effects on park tundra vegetation and soils and wildlife habitat would be moderate relative to the extensive area of these vegetation and soil types in the area surrounding Wonder Lake. This alternative would contribute no new impacts.

Conclusions: The alternative would produce no new impacts.

Alternative 2 – Climate Reference Station near the Wonder Lake Campground (NPS Preferred Alternative)

Effects on Vegetation, Wetlands and Soils

The project would result in the removal of up to 625 square feet of dwarf birch-dominated wetlands vegetation where areas are cleared for the installation of concrete bases, footpads for instrument towers, and buried wiring. The specific wetlands type is PSS1B (palustrine scrub-shrub broad-leaved deciduous with saturated soils). The effects on park moist tundra vegetation and soils would be minor relative to the hundreds of thousands of acres of these vegetation types and soil types within the park and preserve.

Cumulative Effects: The existing facilities around Wonder Lake, including the campground and access roads, park road, and Ranger Station complex, have affected about 13 acres of low and tall shrub vegetation and related wildlife habitat. The cumulative effects on park tundra vegetation, wetlands and soils would be moderate relative to the extensive area of these vegetation and soil types in the area surrounding Wonder Lake. This alternative would contribute a negligible impact.

Conclusions: The proposed disturbance of up to 625 square feet of moist tundra vegetation and soils from the new climate station installations would have a negligible effect on park vegetation, wetlands and soils.

Effects on Wildlife and Habitat

Up to 625 square feet of dwarf birch-dominated wildlife habitat would be excluded for use by large mammals by the erection of an electric fence around the instrument cluster. Around 100 square feet of small mammal habitat would be removed from small mammal use by constructing instrument bases.

Cumulative Effects: The existing facilities around Wonder Lake, including the campground and access roads, park road, and Ranger Station complex, have affected about 13 acres of low and tall shrub vegetation and related wildlife habitat. The cumulative effects on park tundra vegetation and soils and wildlife habitat has been moderate relative to the extensive area of this habitat type in the area surrounding Wonder Lake and this alternative would contribute a negligible impact.

Conclusions: The effect of excluding large mammal use on up to 625 square feet and of excluding small mammal use on 100 square feet of dwarf birch-dominated habitat would be negligible.

Effects on Cultural Resources

The site has a medium probability for archeological or other cultural resources because it is part of an area with known sites and good visibility above a large lake. Removing the RAWS from the Ranger Station would have a minor beneficial impact on the visual integrity of the cultural landscape of the park road and Ranger Station. The site would be visited and surveyed for cultural resources prior to the installation of the station. The park is seeking a conditional "No Adverse Effect" determination.

Cumulative Effects: The existing facilities around Wonder Lake include the campground and access roads, park road, and Ranger Station complex, all of which are eligible or likely eligible for the National Register of Historic Places. The cumulative effects on cultural resources are hard to quantify since most of the facilities that have been developed around Wonder Lake are old enough and important enough to be either on or eligible for the National Register, and no known archeological resources have been disturbed. This alternative is unlikely to contribute new impacts and there would be a minor beneficial impact from removing the RAWS from the landscape nearby to the park road and the Ranger Station.

Conclusions: Removing the RAWS from new the Ranger Station would have a minor beneficial impact on the integrity of the cultural landscape of the park road and the Ranger Station. There would be a medium likelihood of encountering cultural resources at the proposed climate station site.

Effects on Visitor Use and Aesthetics

Though the station would not be visible from the Wonder Lake Campground, day hiking is common past the site by campers or others off the park buses. Campers follow the service road to gain views to the west or to go uphill or they follow the social trails paralleling the old waterline from the water tank. The hillside above the campground is also favored by campers during blueberry season in August.

After a break-in period for the new Climate Reference Network station, the RAWS at the Wonder Lake Ranger Station would be removed, thus eliminating a non-historic and out-of-character apparatus from the roadside experience of visitors travelling along that section of park road. There would be a negligible adverse impact from establishing the new station but a minor beneficial impact from removing the RAWS so close to the road and near the Ranger Station.

Cumulative Effects: The visitor experience has benefited from the access the park road provides, from having hiking trails near both ends of the lake and from having a campground near the lake with an impressive view of Mt. McKinley. The cumulative effects on visitor use have been moderately beneficial from the road, campground and trail development. This alternative would contribute a minor beneficial impact from removing the visible and out-of-character RAWS near the Ranger Station.

Conclusions: The proposed climate station and would have a negligible effect on the visitor use and visual quality and there would be a minor beneficial impact from removing the RAWS from near the park road and the Ranger Station.

Effect on Park Operations

Though the station would be installed and maintained by NOAA personnel, NPS staff at the park or in Fairbanks would need to be trained in the technicalities of the instruments and power sources, and would likely be called in for non-scheduled maintenance. Up to three road travel vehicle permits per summer could be required for station maintenance. The RAWS would be removed after a year and could be set up at a remote site needing a weather station.

The additional equipment at the climate station vs. the existing RAWS would provide higher quality and more extensive data to researchers and managers about the changing conditions of vast acres of a warming permafrost landscape. Providing park managers with accurate and detailed information about the status, trend, and spatial distribution of ongoing and projected changes in key climate attributes is critical to the understanding of the climatic drivers and the long-term outlook for additional changes. There would be a negligible adverse impact on park operations from the potential for the need for additional staff time and a negligible beneficial impact from having more extensive climate and soils data from the area.

Cumulative Effects: The cumulative effects on park operations have been moderately beneficial by having a Ranger Station and related housing and shops for both summer and winter operations in this somewhat isolated part of the park. This alternative would contribute negligible impacts to park operations.

Conclusion: The equipment and maintenance for the climate station would be paid for by NOAA, and the RAWS removed from the Ranger Station could be used as a backup to other weather stations in Interior Alaska. There would be a negligible adverse impact on park operations from the potential for the need for additional staff time and a negligible beneficial impact from having more extensive climate and soils data from the area.

CONSULTATION AND COORDINATION

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REFERENCES

Norris, Frank. 2006. Crown Jewel of the North – An administrative History of Denali National Park and Preserve, Volume 1. Alaska Regional Office, National Park Service

NPS, 1986. General Management Plan, Land Protection Plan, and Wilderness Suitability Review, Denali National park and Preserve, Alaska. NPS D-96A

APPENDIX A

SUBSISTENCE - SECTION 810(a) OF ANILCA SUMMARY EVALUATION AND FINDINGS

I. INTRODUCTION

This section was prepared to comply with Title VIII, Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA). It summarizes the evaluation of potential restrictions to subsistence uses in Denali National Park and Preserve that could result from the installation and maintenance of a new climate reference station in the Wonder Lake area of Denali National Park and Preserve.

II. THE EVALUATION PROCESS

Section 810(a) of ANILCA states:

"In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands . . . the head of the federal agency . . . over such lands . . . shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be affected until the head of such Federal agency -

(1) gives notice to the appropriate State agency and the appropriate local committees and regional councils established pursuant to section 805;

(2) gives notice of, and holds, a hearing in the vicinity of the area involved; and

(3) determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands, (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition, and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions."

ANILCA created new units and additions to existing units of the National Park System in Alaska. Denali National Park and Preserve was created by ANILCA Section 202(3)(a):

"The park additions and preserve shall be managed for the following purposes, among others: To protect and interpret the entire mountain massif, and additional scenic mountain peaks and formations; and to protect habitat for, and populations of, fish and wildlife, including, but not limited to, brown/grizzly bears, moose, caribou, Dall sheep, wolves, swans and other waterfowl; and to provide continued opportunities, including reasonable access, for mountain climbing, mountaineering, and other wilderness recreational activities."

Title I of ANILCA established national parks for the following purposes:

". . . to preserve unrivaled scenic and geological values associated with natural landscapes; to provide for the maintenance of sound populations of, and habitat for, wildlife species of inestimable value to the citizens of Alaska and the Nation, including those species dependent on vast relatively undeveloped areas; to preserve in their natural state extensive unaltered arctic tundra, boreal forest, and coastal rainforest ecosystems to protect the resources related to subsistence needs; to protect and preserve historic and archeological sites, rivers, and lands, and to preserve wilderness resource values and related recreational opportunities including but not limited to hiking, canoeing, fishing, and sport hunting, within large arctic and subarctic wildlands and on free-flowing rivers; and to maintain opportunities for scientific research and undisturbed ecosystems.

". . . consistent with management of fish and wildlife in accordance with recognized scientific principles and the purposes for which each conservation system unit is established, designated, or expanded by or pursuant to this Act, to provide the opportunity for rural residents engaged in a subsistence way of life to continue to do so."

The potential for significant restriction must be evaluated for the proposed action's effect upon ". . . subsistence uses and needs, the availability of other lands for the purposes sought to be achieved and other alternatives which would reduce or eliminate the use. . . ." (Section 810(a))

III. PROPOSED ACTION ON FEDERAL LANDS

Alternatives 1 and 2 are described in detail in the environmental assessment. Customary and traditional subsistence use on NPS lands will continue as authorized by federal law under all alternatives. Federal regulations implement a subsistence priority for rural residents of Alaska under Title VIII of ANILCA.

The NPS proposes to permit the installation and maintenance of a Climate Reference Network station near the Wonder Lake Campground in Denali National Park.

IV. AFFECTED ENVIRONMENT

Subsistence uses within Denali National Park and Preserve are permitted in accordance with Titles II and VIII of ANILCA. Section 202(3)(a) of ANILCA authorizes subsistence uses, where traditional, in the northwestern and southwestern preserves of Denali National Preserve. Lands within former Mount McKinley National Park are closed to subsistence uses.

A regional population of approximately 300 eligible local rural residents qualifies for subsistence use of park resources. Resident zone communities for Denali National Park and Preserve are Cantwell, Minchumina, Nikolai, and Telida. By virtue of their residence, local rural residents of these communities are eligible to pursue subsistence activities in the new park additions. Local rural residents who do not live in the designated resident zone communities, but who have customarily and traditionally engaged in subsistence activities within the park additions, may

continue to do so pursuant to a subsistence permit issued by the Park Superintendent in accordance with state law and regulations.

The NPS realizes that Denali National Park and Preserve may be especially important to certain communities and households in the area for subsistence purposes. The resident zone communities of Minchumina (population 22) and Telida (population 3) use park and preserve lands for trapping and occasional moose hunting along area rivers. Nikolai (population 122) is a growing community and has used park resources in the past. Cantwell (population 147) is the largest resident zone community for Denali National Park and Preserve, and local residents hunt moose and caribou, trap, and harvest firewood and other subsistence resources in the 1980 park and preserve additions.

The main subsistence species, by edible weight, are moose, caribou, furbearers, and fish. Varieties of subsistence fish include coho, king, pink and sockeye salmon. Burbot, dolly varden, grayling, lake trout, northern pike, rainbow trout and whitefish are also among the variety of fish used by local people. Beaver, coyote, land otter, weasel, lynx, marten, mink, muskrat, red fox, wolf and wolverine are important furbearer resources. Rock and willow ptarmigan, grouse, ducks and geese complete the park/preserve subsistence small game list.

The NPS recognizes that patterns of subsistence use vary from time to time and from place to place depending on the availability of wildlife and other renewable natural resources. A subsistence harvest in any given year many vary considerably from previous years because of such factors as weather, migration patterns and natural population cycles. However, the pattern is assumed to be generally applicable to harvests in recent years with variations of reasonable magnitude.

V. SUBSISTENCE USES AND NEEDS EVALUATION

To determine the potential impact on existing subsistence activities, three evaluation criteria were analyzed relative to existing subsistence resources that could be impacted.

The evaluation criteria are:

- the potential to reduce important subsistence fish and wildlife populations by (a) reductions in numbers; (b) redistribution of subsistence resources; or (c) habitat losses;
- the affect the action might have on subsistence fishing or hunting access; and
- the potential to increase fishing or hunting competition for subsistence resources.

The potential to reduce populations:

Land use activities could have temporary and/or long-term impacts on wildlife habitat, depending on the nature and extent of the disturbance.

The alternatives would not adversely affect the distribution or migration patterns of subsistence resources. Therefore, no change in the availability of subsistence resources is anticipated as a result of the implementation of the proposed action.

Restriction of Access:

The proposed actions are not anticipated to result in a significant restriction to subsistence access. Access for Federal subsistence uses in Denali National Park and Preserve is granted pursuant to Federal and non-conflicting State regulations. Denali National Park and Preserve is managed according to legislative mandates, NPS management policies and the park's General Management Plan.

Increase in Competition:

The proposed actions are not expected to significantly increase competition for ANILCA Title VIII subsistence resources or uses on Federal public lands within the affected area.

VI. AVAILABILITY OF OTHER LANDS

Choosing a different alternative would not decrease the impacts to park resources for subsistence. The preferred alternative is consistent with the mandates of ANILCA, including Title VIII, and the NPS Organic Act.

VII. ALTERNATIVES CONSIDERED

The alternatives considered for this project were limited to **1)** no action, and **2)** installing a Climate Reference Network station near Wonder Lake, within the boundaries of the former Mt. McKinley National Park wherein no subsistence uses are permitted.

VIII. FINDINGS

This analysis concludes that the preferred alternative would not result in a significant restriction of subsistence uses.

APPENDIX B
Climate Reference Network Instrumentation

Air Temperature
USCRN stations are equipped with three temperature sensors each mounted in a separate aspirated solar radiation shield. In general, an aspirated air temperature sensor is superior to one mounted in a passive radiation shield. Errors in a passive shield can be as large as several degrees Centigrade in calm wind and strong solar radiation/sunlight conditions.

Precipitation
All USCRN stations are equipped with heated precipitation gauges configured with three vibrating-wires to measure both liquid and solid precipitation, and a wetness sensor to improve upon the gauge's accuracy. Most USCRN stations are also equipped with a tipping bucket gauge.

Solar Radiation
Solar radiation (sunlight) is one of two variables needed to develop the relationship between air temperature measured at a USCRN station and air temperature measured at nearby historical stations. Solar radiation also can be used to assess the type of clouds during daytime and it is an important variable in agricultural and hydro-meteorological models. The USCRN contributes significantly to the development of a high quality U.S. solar radiation database.

Wind Speed
Wind speed at the height of the temperature sensor is the second of two variables needed to develop the transfer function between temperature measured at a USCRN station and temperature measured at nearby or co-located historical stations.

These variables are transmitted hourly via satellite, and summary statistics are computed operationally at the National Climatic Data Center (NCDC).

Measured Elements
The primary purpose of the USCRN network is to monitor air temperature and precipitation. In addition to air temperature and precipitation, each station measures ground surface (IR) temperature, solar radiation, wind speed, and several values that monitor the operating condition of the equipment. These secondary parameters contribute to improving the confidence in the observational measurements, and provide insight into the reliability and performance of the primary sensors. Each station transmits data once every hour to a GOES satellite; within a few moments of transmission the data are available on this web site. This page describes the details of this data stream.

Primary Measurements:
Surface Air Temperature
Precipitation
Data Stream Summary

Secondary Measurements:
IR Ground Surface Temperature
Solar Radiation
Wind Speed
Miscellaneous

Surface Air Temperature
Each USCRN station has three thermometers which report independent temperature measurements each hour. These three observed temperature value are used to derive a single *official USCRN temperature* value for the hour. This single value is sometimes a median and sometimes an average of various combinations of the three observed values, depending on information about which equipment is functioning reliably. For the details of how this single value is computed, see the Official USCRN Temperature Algorithm. Each station transmits the three independent observed values; the computation of the official USCRN temperature

value is done after these values arrive at NCDC. The discussion below describes the details of the three observed values.

Each station has three Thermometrics platinum resistance thermometers, each of which is housed in its own Met One 076B 7308 aspirated solar shield. Each thermometer measures the temperature (in degrees Celsius) every 2 seconds. Every 5 minutes the station datalogger computes the average of these 2-second values, giving 12 5-minute averages for each thermometer:

T_i^k = average of 2-second values for i-th 5-minute period in the hour, i=1,...,12. [k is the thermometer number (1, 2, or 3).]

The station's hourly data stream contains the following 7 values for each thermometer (a total of 21 values):

1. T^k_{avg} = average (°C) of T^k_1, ..., T^k_{12}
2. T^k_{stdev} = standard deviation of T^k_1, ..., T^k_{12}
3. T^k_{min} = minimum (°C) of T^k_1, ..., T^k_{12}
4. $T^k_{mintime}$ = time at which the above minimum occurred
5. T^k_{max} = maximum (°C) of T^k_1, ..., T^k_{12}
6. $T^k_{maxtime}$ = time at which the above maximum occurred
7. T^k_{12} (°C)

In addition to the above thermometer values, the station also measures the speed of the fan in each aspirated shield. As the shield's fan rotates, a contact closes and generates a pulse twice per rotation. The datalogger counts these pulses every two seconds. Every hour these 2-second values are averaged to obtain an average number of pulses per second for the hour. The hourly data stream from the station thus include the following values (one value for each of the three sensors):

FS^k = average of 2-second pulse rates for the hour, in pulses per second, for shield number k = 1,2,3.

Note that the speed of the fan, in revolutions per second, is half of FS^k.

For more details about the temperature sensor and measurements, see the Air Temperature Sensor Summary. For more details about the aspirated shield, see the Aspirated Shield Summary.

Precipitation

Each USCRN station measures precipitation with a Geonor T-200B precipitation gauge. This gauge produces several independent observed precipitation measurements each hour. These observed values are used to derive a single *official USCRN precipitation* value for the hour. For the details of how this single value is computed, see the Official USCRN Precipitation Algorithm. Each station transmits the observed values; the computation of the official USCRN precipitation value is done after these values arrive at NCDC. The discussion below describes the details of the observed values.

The Geonor T-200B uses a collection bucket which is suspended by three vibrating wire strain gauges. Each wire, when excited with 12V DC, vibrates with a frequency relative to the weight in the collection bucket. The gauge is surrounded by a small wind/snow shield, and a controlled heater device is attached to the gauge to prevent ice buildup. The station datalogger measures the frequency of each vibrating wire and converts it to a gauge depth (in mm) each hour on the hour, at 15 minutes past the hour, at 30 minutes past the hour, and at 45 minutes past the hour. The hourly data stream contains the following values 12 for

each wire k = 1,2,3 (a total of 36 values):

1. P^k_1 = precipitation (mm) for 1st 15 minutes of the hour
2. P^k_2 = precipitation (mm) for 2nd 15 minutes of the hour
3. P^k_3 = precipitation (mm) for 3rd 15 minutes of the hour
4. P^k_4 = precipitation (mm) for 4th 15 minutes of the hour
5. P^k_{tot} = precipitation total (mm) for hour
6. D^k_4 = gauge depth (mm) at end of 1st 15 minutes of the hour
7. D^k_4 = gauge depth (mm) at end of 2nd 15 minutes of the hour
8. D^k_4 = gauge depth (mm) at end of 3rd 15 minutes of the hour
9. D^k_4 = gauge depth (mm) at end of 4th 15 minutes of the hour
10. F^k_{avg} = average wire frequency for the hour
11. F^k_{min} = minimum wire frequency for the hour
12. F^k_{max} = maximum wire frequency for the hour

For more details on the operation of the Geonor precipitation gauge and how these values are computed, see the Precipitation Gauge Summary.

A Hydrological Services Tipping Bucket Rain Gauge Model TB-3 is installed at some sites for comparison purposes only. Its data are not quality controlled and are not considered official USCRN precipitation readings.

IR Ground Surface Temperature

An Apogee Instruments IRTS-P infrared temperature sensor measures the infrared ground surface temperature (in degrees Celsius) at each station. The datalogger samples the sensor every two seconds. Every five minutes these two-second samples are averaged to obtain 5-minute values. Each hour the station's data stream contains:

1. IR_{avg} = average (°C) of the 12 5-minute values for the hour
2. IR_{stdev} = standard deviation of the 12 5-minute values for the hour

For more details about the IR Ground Surface Temperature sensor, see the summary.

Solar Radiation

A Kipp & Zonen SP Lite Pyranometer measures solar radiation (watts per meter squared, W/m^2) at each station. The datalogger samples the sensor every two seconds. Every five minutes these two-second samples are averaged to obtain 5-minute values. Each hour the station's data stream contains:

1. SR_{avg} = average (W/m^2) of the 12 5-minute values for the hour
2. SR_{stdev} = standard deviation of the 12 5-minute values for the hour

For more details about the solar radiation sensor, see the summary.

Wind Speed

A Met One Model 014A anemometer measures wind speed (in meters per second) at each station. The datalogger samples the anemometer every two seconds. Every five minutes these two-second samples are averaged to obtain 5-minute values. Each hour the station's data stream contains:

1. WS_{avg} = average (meters/sec) of the 12 5-minute values for the hour
2. WS_{stdev} = standard deviation of the 12 5-minute values for the hour

FINDING OF NO SIGNIFICANT IMPACT

FOR INSTALLATION AND OPERATION OF A U.S. CLIMATE REFERENCE NETWORK (USCRN) STATION THAT MEETS SPECIFIC REQUIREMENTS FOR CLIMATE OBSERVATIONS BY THE NATIONAL PARK SERVICE

(Based on Adoption of the National Park Service Environmental Assessment *Installation of a Climate Reference Network Station at Wonder Lake Denali National Park and Preserve*, April 2014; as well as an independent NOAA review conducted in March 2015)

1. Background and Purpose

The National Environmental Satellite, Data, and Information Service (NESDIS) is part of the National Oceanic and Atmospheric Administration (NOAA). NESDIS is responsible for development, construction, and operations for climate observing systems in support of the NOAA mission pursuant to the following authorities:

- United States 15 U.S.C. § 313 which give NOAA jurisdiction by law for the collection of the taking of such meteorological observations as may be necessary to establish and record the climatic conditions of the United States.
- United States 15 U.S. Code § 2904 which authorizes the global data collection, and monitoring and analysis activities to provide reliable, useful and readily available information on a continuing basis.
- National Weather Service organic act, 15 USC sec. 313 (authorizes weather related activities, including taking observations)

Council on Environmental Quality (CEQ) Regulations state that determination of significance using an analysis of effects requires examination of both context and intensity. CEQ lists 10 criteria for intensity (40 CFR 1508.27). NOAA Administrative Order (NAO) 216-6 Section 6.01b provides additional criteria for determining if impacts of a proposed action are significant. For site-specific actions such as those proposed in the National Park Service (NPS) Environmental Assessment (EA), appropriate context for considering significance of action is local, as opposed to national or worldwide.

Due to the fact that NPS already provided for public participation in development of the NPS EA, NESDIS does not plan to distribute its adoption memorandum and this FONSI to the public. Further, CEQ regulations at 40 CFR 1506.3(b) state that if the actions covered by the original environmental analysis and the proposed action are substantially the same, the agency adopting another agency's statement is not required to recirculate it except as a final statement. A legal notice of the availability of the documents will be published in the Federal Register.

2. Description of Proposed Actions and Alternatives

NOAA/NESDIS proposes to install and operate a USCRN station in support of the NOAA mission at the Wonder Lake site in Denali National Park and Preserve in Alaska.

The USCRN equipment that are provided NEPA compliance by this EA would meet rigorously defined criteria ensuring that the USCRN installation and operation would not present any new or significant environmental impacts as compared to previously analyzed and documented impacts.
Alternatives reviewed by the NPS RPEA deemed unacceptable included:

Alternative 1 – No Action

Under the No Action alternative, no Climate Reference Station would be constructed at the end of the Wonder Lake Campground water tank road. In choosing this alternative, NOAA/NESDIS would not

install a USCRN station as part of the NOAA mission. This would place NOAA at increased risk of failing to expand its USCRN network in Alaska as mandated by the US Congress via formal annual appropriations and maintain its mission requirements of monitoring the long-term climate signal in a climate-vulnerable state like Alaska. This latter alternative poses substantial risk to the ability to monitor climate in Alaska which on a long-term basis poses property and life risks for the United States, Alaska, and its citizens.

Alternative 2 – USCRN Network Station near the Wonder Lake Campground (NOAA Preferred Alternative)

A four-season USCRN station would be installed on a level bench about 150' east of the water tank road and about 300 feet southeast of the water treatment building for the Wonder Lake Campground. Installation would involve three, equally-spaced instruments: an aluminum station with a sensor tower, solar panels, and precipitation gage with a double alter windshield mounted on a base. Instrument towers have approximate heights of 20', 5'8", and 6', respectively, and are needed to support sensors for air temperature, precipitation and wind speed. If needed, a small, 18' high wind turbine with 4' diameter blades would be installed for back-up power support. "Equipment will be installed on a special, small, light-foot print system, also known as a geoblock system, currently used for such installations in the area. They sit on top of the ground surface; and, as such, no soil excavation or removal is required for this system. The NPS Environmental Assessment (EA), dated April 2014, indicates that disturbing up to 625 square feet will have negligible impact upon vegetation or soil. The entire area (approximately 25' x 25') may be surrounded by electric fencing to protect equipment from large mammal interest; the power for this fence would come from the existing USCRN solar array.

3. Environmental Consequences

The selected alternative complies with the NPS Organic Act, The Alaska National Interest Lands and Conservation Act of 1980 (ANILCA), the Endangered Species Act, the National Historic Preservation Act, and Executive Orders 11988 (floodplains) and 11990 (wetlands). There will be no restriction of subsistence activities as documented by the ANILCA, Section 810(a) Summary Evaluation and Findings appended to the NPS EA.

The NPS determined the selected alternative does not constitute a major federal action significantly affecting the quality of the human environment. Based on independent environmental review, NESDIS concurs with this finding. Therefore, in accordance with the National Environmental Policy Act of 1969 and regulations of the Council on Environmental Quality (40 CFR 1508.9), an environmental impact statement is not needed and will not be prepared for this project.

As such, the NOAA proposed action for the installation and operation of a USCRN station:

- Will not have impacts that overall may result in a significant effects, adverse or beneficial, to the human environment, to public health or safety, or to unique characteristics of geographic areas, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

- Is not expected to be highly controversial and will pose no risks to the natural or human environment.

- Will not adversely affect the sites in the Park, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, or cause any loss or destruction of significant scientific, cultural, or historical resources.

- Will not have a significant impact on endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973 or other NOAA Statutes. It will not threaten or be in violation of any Federal, state, or local laws or requirements imposed for environmental protection, and will not result in the introduction or spread of any nonindigenous species.

4. Conclusion

After careful and thorough consideration of the facts herein, the undersigned finds that the proposed federal action is consistent with existing national environmental policies and objectives set forth in sections 101(a) and 101(b) of NEPA and will not significantly affect the quality of the human environment or otherwise result in any condition requiring consultation pursuant to section 102(2)(c) of NEPA. Therefore, a FONSI is supported and appropriate, and that preparation of an Environmental Impact Statement is not warranted.

Stephen M Volz — 6/12/15

Dr. Stephen M. Volz
Assistant Administrator for
Satellite and Information Services

Date