

# **Environmental Assessment**

**Prepared by**  
**U.S. Department of the Interior**  
**Bureau of Land Management**

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# **Chapter 1. Introduction**

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## **1.1. Identifying Information:**

### **1.1.1. Title, EA number, and type of project:**

NEON Toolik

DOI-BLM-AK-F030-2014-0046-EA

### **1.1.2. Location of Proposed Action:**

Within Secs. 20, 29 and 32, T. 9 S., R. 11 E., Secs. 17 and 19, T. 9 S., R. 12 E., and Secs. 8 and 17, T. 9 S., R. 13 E., Umiat Meridian, Alaska, containing approximately 5.00 acres.

### **1.1.3. Name and Location of Preparing Office:**

Lead Office - Central Yukon Field Office and number DOI-BLM-AK-F030-2014-0046-EA

Central Yukon Field Office

1150 University Avenue

Fairbanks, Alaska 99709

### **1.1.4. Identify the subject function code, lease, serial, or case file number:**

289004 Right-of-Way Grant

Case file number F-96805

### **1.1.5. Applicant Name:**

National Ecological Observatory Network (NEON), Incorporated

## **1.2. Purpose and Need for Action:**

**Background:** NEON is an NSF funded project and will create a new national observatory to collect ecological and climatic observations across the continental United States, including Alaska, Hawaii and Puerto Rico. NEON has partitioned the U.S. into 20 eco-climatic domains, each of which represents different regions of vegetation, landforms, climate, and ecosystem performance. In those domains, NEON will collect site-based data about climate and atmosphere, soils and streams and ponds, and a variety of organisms. The goal of NEON is to enable understanding and forecasting of the impacts of climate change, land use change and invasive species on continental scale ecology by providing infrastructure to support research, education and environmental management in these areas. The NEON approach will standardize scientific ecological efforts, work at continental scale, and integrate observatory operations. As part of the NEON design, the site selection parameters in Alaska are fundamental in understanding the connectivity of the ecology among the NEON Domains as well as the need to reveal immediate ecosystem responses

to the stressors. The Alaskan Domains are significant in helping to understand the interplay of human and natural systems. NEON will use distributed sensor networks, coordinated airborne observations and experiments, integrated by a communications, command, and control system, to collect ecological data across the continental United States, Alaska, Hawaii and Puerto Rico. Each domain will host a fully instrumented core site in minimally managed “wildland” area slated to operate for the 30-year lifetime of NEON, a relocatable site related to land use, invasive species, urban effects to operate for 7-10 years, and aquatic sites including passive monitoring systems and a nutrient addition experiment, STREON. The AQU/STREON subsystem is designed to measure the effects of climate change, land use change, and disturbance on aquatic ecosystem structure and function. The Aquatic subsystem shall measure key aspects of aquatic systems via automated instrumentation and human field-based observations. The STREON experiment will provide an assessment of ecosystem response to predicted future conditions by accelerating known drivers of ecosystem structure and function. The STREON experiment’s goal is to increase ambient nutrient concentrations and monitor effects downstream. The STREON/Aquatic will include infrastructure related to both the aquatic sensor array and STREON experiment.

**Applicant’s Purpose and Need:** In order to achieve its objective of conducting ecological monitoring in Alaska, NEON requires a right-of-way to be issued by the BLM which authorizes the construction, maintenance, operation, and termination of a tower facility, aquatic sensors and related ecological monitoring equipment in the vicinity of Toolik Lake.

**BLM Purpose and Need:** The purpose for action is to determine whether or not to issue a right-of-way to NEON for the use of BLM-managed lands to host environmental observation and ecological data collection facilities in the vicinity of Toolik Lake for up to 30 years. The need for action is established under the authority of Section 302 of the Federal Land Policy and Management Act (FLPMA) of 1976. FLPMA directs the BLM to regulate the use, occupancy and development of public lands.

### **1.3. Scoping, Public Involvement and Issues:**

Public notification of the Environmental Assessment was published to the NEPA Register on file at the Central Yukon Field Office website on July 16, 2014. No comments have been received as of February 3, 2015. Due to the remote location, limited size and scope of the proposed action, and similar existing uses in the area, public interest is expected to be low. As such, additional external scoping of this proposed action is not planned.

# **Chapter 2. Proposed Action and Alternatives**

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## 2.1. Description of the Proposed Action:

In order to accomplish its purpose and need, NEON proposes to construct, maintain and terminate three ecological monitoring facilities in the vicinity of Toolik Lake:

- A tower facility north of the Toolik Research Station,
- A relocatable aquatic facility at Toolik Lake, and
- An aquatic facility at Oksrukyik Creek northeast of the tower facility.

### **Tower Facility:**

The tower facility is proposed to consist of a square lattice tower with internal stairs and a platform system for access. The base of the tower will be 8.5 feet by 8.5 feet. The overall height of the tower will be 26 feet. The tower will be made of galvanized steel and will be powdercoated to blend with the surroundings. The tower will be a self supporting structure on a pile foundation.

The tower facility will also host an instrument hut, which will house the instruments, tools, gas bottles, and safety equipment. The foundation of eight freeze back piles will have a footprint of 10 feet by 20 feet. The instrument hut is 8 feet wide, 20 feet long and 9 feet high. The instrument hut will be painted to blend with the surroundings.



**Figure 2.1. Prototype Instrument Hut and Tower**

A soil array consisting of 5 clusters of 5 bore holes will be located near the tower as part of the tower facility. The bore holes will be approximately 2.5 inches in diameter and, depending on the measurement to be taken for each hole, will be either vertical or at a 45 degree angle. The depth of the holes will be site-specific but will not exceed 7 feet.

A soil pit will also be dug, have soil samples removed, and be refilled with the excavated soil within 3–5 days of breaking ground. The depth of the pit will be refusal or 6 feet. The pit activity will coincide with the site construction and will be supervised.

Associated with the tower facility is electricity generation. Two diesel generators (one providing backup for the other) will be located on a developed 160 feet by 160 feet pad adjacent to the Dalton Highway outside of the highway right-of-way. Fuel storage needs are estimated to be approximately 6000 gallons. Fuel will be stored in double-walled tanks and the facility will comply with environmental requirements including a spill response plan and proper storage of hazardous materials. The fuel and generators will be secured within an enclosure to which the BLM will have access.

An on-grade power line will be run through overground conduit from the generators/ parking area to the tower facility, colocated with the winter access route. The power run will be approximately 6,500 feet long and can be shallow-buried if necessary. The power run/ winter access route will be situated so that passing under the Trans-Alaska Pipeline will not be necessary.

Access to the site will originate at the generator area, which will facilitate parking. During the summer months, NEON proposes to walk to the tower using the existing pipeline service road, and then on a Geoblock path over the tundra which they are proposing to install for that purpose. Winter access will parallel the power conduit and will be via snowmachine. No motorized vehicles will cross under the pipeline.

Construction of the tower facility is expected to take six months. Construction is proposed to occur after the ground has frozen sufficiently to minimize impacts. Staging will occur at the parking/ generator pad location. Construction equipment beyond the staging area will be limited to eight to ten feet in width and will travel along and operate within clearly marked (flagged) limits. Foundation and ground work will occur during winter months only. Heavy and large items, such as the instrument hut, will be staged during the winter to minimize impacts. Construction equipment may include mini-excavators, pickup trucks, skid-steer, snow machines and Nodwells.

After the 30 year life of the tower site, NEON proposes to restore the site to BLM requirements. NEON proposes to remove all infrastructure as well as restore the area impacted by NEON with native vegetation. The existing components described above will be removed and disassembled, any foundations removed (or to below grade per BLM direction) and ground disturbance mitigated via BLM direction.

## **Relocatable Aquatic Facility**

The relocatable aquatic facility is proposed to consist of a buoy, deployed at Toolik Lake, that will house aquatic sensors. The buoy is proposed to be an “off-the-shelf” model, which is still pending selection the figure is an example of a buoy that is being used in other NEON aquatic sites. The buoy will be deployed and retrieved annually by boat, or alternatively, submerged to a depth of 10 feet each winter. Battery/ solar will power the instruments on the buoy. Periodic maintenance visits to the buoy are anticipated every two weeks during the summer. Access to and deployment and retrieval of the buoy will be conducted by small motorized or human-powered boat. Data will be transmitted from the buoy via radio telemetry.



**Figure 2.2. A 6' by 12' Pontoon Profiler**

Groundwater monitoring wells are proposed to be installed in 8 locations around Toolik Lake. The wells will be schedule 100 PVC two inches in diameter enclosed in a steel-cased four inch diameter drilled hole to a depth not to exceed 30 feet. A concrete foundation for each well is proposed, with the concrete being mixed on site. The well hole is to be backfilled with sterile sand and surface sealed with bentonite. Sensors will be deployed in the wells and a small external enclosure will house the battery powered radio and telemetry instrumentation. The wells are proposed to be drilled by a hand-portable auger.

A small meteorological tower will be used to collect weather data. The station will be tripod-mounted. Legs deployed, the diameter of the tripod will be 4–5 feet. The preferred location of the tripod will be the buoy. If buoy-mounting proves impractical, an alternative land-based location has been identified

Any overland access needed for the relocatable aquatic facility will be by foot. Should foot access require it to become more beneficial to the resource, NEON proposes to install Geoblock boardwalks on grade.

The aquatic facility is proposed for a period of ten years.

Any construction activities that would require machinery will be conducted during winter months.

NEON proposes to restore the site to BLM requirements. The existing aquatic components described above will be removed and disassembled, (foundations left in place or removed to slightly below grade- based on BLM preference) and ground disturbance mitigated via BLM direction. There are no other ground disturbing activities associated with the NEON project at Toolik Lake. Well decommissioning will include the casing removal, concrete sealant will be removed and bentonite in the well will be abandoned in place. The PVC well will be removed according to the permit. Sand will remain, and any voids will be filled with native materials

## **Core aquatic facility at Oksrukyik Creek**

Four sets of sensors will be installed. The sensors will be battery/ solar powered and secured by rebar to the stream bed. Sensors will be deployed and recovered annually coinciding with seasonal freezing and thawing. Access to the sensors will be via foot from the established parking area identified in figure, and will be required approximately 2 times per month. Data will be transmitted via radio telemetry.

Groundwater monitoring wells are proposed to be installed in 8 locations around Oksrukyik Creek. The wells will be schedule 100 PVC two inches in diameter enclosed in a steel-cased four inch diameter drilled hole to a depth not to exceed 30 feet. A concrete foundation for each well is proposed, with the concrete being mixed on site. The well hole is to be backfilled with sterile sand and surface sealed with bentonite. Sensors will be deployed in the wells and a small external enclosure will house the battery powered radio and telemetry instrumentation. The wells are proposed to be drilled by a hand-portable auger.

A small enclosure is proposed to be constructed to house the nutrient addition equipment for a nutrient addition experiment known as STREON. Nutrients to be stored on site are phosphorous and sulfate. The equipment will be gravity-fed and battery/ solar powered. The dimensions of the enclosure are not yet determined. The foundation for the enclosure is also to be determined, but it will not require excavation or heavy equipment. Access to the enclosure is proposed to be foot; access frequency is estimated at twice per month. NEON proposes to install Geoblock boardwalk from the parking area to the array. The sensors and nutrients are proposed to be removed seasonally.

A small meteorological tower will be installed to collect weather data. The station will be monopole or tripod-mounted. It will be powered by battery/ solar, or overground conduit.

## **2.2. Description of Alternatives Analyzed in Detail:**

No other alternatives were analyzed for this proposal because the best location for this ecological data collection is at and near the Toolik Lake Field Station

## **2.3. Alternatives Considered but not Analyzed in Detail**

### **No Action Alternative**

The no alternative action would result in the BLM not issuing a right-of-way grant to NEON to conduct ecological and climate data as part of their continental-scale mission. This would affect their research in a negative manner as the arctic domain's information would not be collected.

## **2.4. Conformance**

The EA is in conformance with the Utility Corridor Resource Management Plan (UCRMP) approved January 11, 1991. The UCRMP states in Chapter 2, section 2–23: “Title V of the Federal Land Policy and Management Act (FLPMA) of October 21, 1976, provides for the issuance of right-of-way grants to authorize rights-of-way upon, under, or through public lands for construction, operation, maintenance and termination of a project. The regulations found in 43 CFR 2800 and 2880 govern the issuance, amendments, and renewals of rights-of-way grants for

necessary transportation, other systems, or facilities which require authorization including: roads, trails, pipelines, communications sites, power distribution and transmission lines, and such other necessary transportation, other systems or facilities which are in the public interest.

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## **Chapter 3. Affected Environment:**

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**Fire Management:** The project location is within a limited fire protection area. The Toolik Lake Camp is the only spot nearby that is designated at a site to protect. Lightning fires in the area would be allowed to burn so long as the Toolik camp could be protected and wildfires from originating from human activities would be suppressed per BLM policy and cost recovery would be pursued. The tundra vegetation in the area is generally damp or covered by snow, however, during periods of warmer temperatures, wind, and sun it dries out in a matter of days and is susceptible to flashy grass/brush fires where an ignition source presents itself.

**Fish:** The proposed action lies within the general range of Arctic grayling (*Thymallus arcticus*), Dolly Varden (*Salvelinus malma*), Arctic char (*Salvelinus alpinus*), and whitefish (*Coregonid* spp.), with burbot (*Lota lota*) occasionally present (ADF&G 1978). Toolik Lake and Oksrukuyik Creek are not listed with the State of Alaska as important for the spawning, rearing, or migration of anadromous fish (ADF&G 2014). Aquatic surveys have not been conducted by BLM personnel on Toolik Lake or Oksrukuyik Creek. Investigations by McDonald (1989 and 1992) and other Toolik Lake Field Station investigators have documented burbot, Arctic grayling, lake trout (*Salvelinus namaycush*), round whitefish (*Prosopium cylindraceum*) and slimy sculpin (*Cottus cognatus*) in Toolik Lake.

**Riparian - Wetlands – Soil - Water Quality:** The Arctic LTER area surrounding Toolik Lake is located in the northern foothills of the Brooks Range, Alaska, in tundra vegetation composed of sedges and grasses mixed with dwarf birch and low willows. Permafrost is generally present, resulting in poorly drained soils that remain saturated throughout much of the growing season. Mean annual temperatures are about -10 degrees Celsius and mean annual precipitation is about 10 inches. Surface waters and soils are frozen much of the year. Walker et al (1987) noted that because of the short summer thaw period (about 90 days), the low summer temperatures, and the insulating properties of the organic surface soil, the seasonal thaw ranges from less than 1.5 feet in wet, fine-grained sediments to generally less than 3 feet in the coarser materials.

Though there are disturbances in the vicinity of the Toolik Research Natural Area due to roads, buildings and experimental plots, the riparian-wetlands of the area are suspected to be in *Proper Functioning Condition* (PFC). PFC is a term used by the BLM to describe if the natural physical processes of the riparian-wetlands are being achieved and relates to the desired ecological conditions established in the Alaska Land Health Standards (BLM 2004).

Water quality within the Toolik Lake and Oksrukuyik drainages is expected to be good given the lack of disturbance in these drainages. Turbidity is expected to be low except during higher flows associated with spring breakup and seasonal storm events.

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# **Chapter 4. Environmental Effects:**

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**Fire Management:** Human activity always increases the probability of a wildfire started by humans to some small degree. The proposal does not specifically mention any activities that would increase the risk of fire beyond the normal risk associated with any other human activity. The proposed activities environmental effect on Fire Management is minimal.

**Fish:** After reviewing the material in the file, it appears that impacts to the aquatic habitat or resources due to actual measurement would be so minimal that they would be difficult to detect. There is a potential for direct impact to stream bank or lake shore habitat in situations where the same access route is used to gather repeated measurements at a specific site. Deterioration of the banks/shores (sloughing/vegetative loss) could also cause indirect impacts to organisms through increased erosion and subsequent in-stream habitat sedimentation and turbidity. Avoiding repeated use of the same trails and construction of boardwalks should minimize this type of habitat impact.

The proposed addition of phosphorous and sulfate has the potential to directly impact water quality, primary productivity, and invertebrate and fish habitat and numbers. These impacts would be localized and are not expected to cause any long lasting effects. A concern does arise with the storage of quantities of nutrients near study sites. Accidental release of large quantities of nutrients could impact aquatic organisms and can be avoided by storing all such substances in waterproof containers.

Snow machine use is proposed during this research project. To avoid possible disturbance to resident fish populations utilizing over wintering habitat, it is recommended that travel up and down streambeds be prohibited. Adequate snow cover and frozen ground should also be included as conditions of snow machine use in order to prevent excessive vegetative destruction.

Oil and gas transportation, gravel mining, road building and maintenance, research and recreation activities are the major past, present, and foreseeable future activities that could impact resources within the watersheds surrounding the Arctic LTER area. Cumulative impacts to aquatic habitat and resources are not expected to be a factor over the life of this permit if activity remains close to current levels and adequate stipulations are included in this EA to mitigate impacts. Specific attention should be paid to controlling erosion along access routes.

**Water Quality:** Data collection activities could cause minor sediment and turbidity impacts of short-term duration during installation and sampling with equipment placed directly into or adjacent to Oksrukuyik Creek and Toolik Lake. Trampling of vegetation along creek and lake edges could cause increased erosion of sediment into these water bodies as well. These potential impacts can be minimized if the number of trips to each site is kept to a minimum, if varied routes are used by samplers, and if boardwalks are constructed.

Use of fuel to support use of generators and other motorized equipment at experiment sites could cause fuel spills and resulting negative water quality impacts to streams, lakes, and tundra. Assuming that fuel storage and transfer techniques are adequate, and that fuel volumes used are kept to a minimum, water quality impacts from fuel spills should be negligible.

Environmental manipulation experiments where phosphorous and sulfate are applied to stream environments will directly impact water quality. However, given the controlled nature of the application, it is expected that, once released, these nutrients would quickly be dispersed, utilized by micro and macro organisms, and adsorbed onto organic matter and sediment. Therefore, limited chemical additions are not expected to cause long-lasting effects. Accidental releases of large quantities of nutrients and other compounds in to small water bodies through improper storage of chemicals could cause toxicity problems for aquatic organisms. The potential for

spills of this type can be minimized if long-term storage of the phosphorous and sulfate includes use of containers adequate to resist erosion and leaking and by locating storage areas outside of water body floodplains.

**Wetlands, Soils and Riparian:** Placement and monitoring of small, portable weather stations, sensors and gauges, cause few direct impacts to wetland environments found throughout the Toolik Lake RNA. Placement of the tower and instrument hut and STREON platforms under this permit will cover ~200-300 square feet of tundra area. Covering the tundra vegetation will cause direct impacts to the underlying vegetation and soil permafrost regimes. Expected impacts include killing of plants, compaction of soils, and alteration of the immediate subsurface and surface hydrology. This could lead to limited thawing, subsidence, and ponding. All of these sites will require restoration with native vegetation at the conclusion of the experiment. Blocking of sunlight may kill vegetation under the Geoblock and boardwalks during the duration of the experiments. The construction and over land move of the tower facility also has the potential to impact wetland vegetation. Scarifying compacted soils and replanting with native vegetation will be required in affected areas in order to prevent erosion and subsidence. To further protect soils and vegetation, construction of the tower site and movement of heavy equipment should follow the Utility Corridor Plan stipulations requiring adequate freeze down and snow cover.

Addition of fertilizer to nutrient limited wetland, lake, and stream environments may cause short-term bursts in productivity at some sites, but long-term impacts would not be expected as long as fertilizer rates are kept low and accidental releases are avoided.

There will be a small direct loss of riparian habitat where trails occur. In addition, boardwalks may adversely affect riparian habitat in some places through shading. The total loss of habitat will be minor and the cumulative effects will also be negligible.

Collection of shallow and deep soil cores as well as excavation of soil pits will directly impact the soil and vegetation where the cores and pits are dug. The applicant proposes to refill pits and borings which should mitigate thaw impacts to the tundra. Scarifying compacted soils and replanting with native vegetation should be required where the soil pit is being dug in order to prevent erosion and subsidence.

Oil and gas transportation, gravel mining, road building and maintenance, research and recreation activities are the major past, present, and foreseeable future activities that could impact resources within the watersheds surrounding the Arctic LTER area. Cumulative impacts to water quality, wetlands, soils and riparian are not expected to be a factor over the life of this permit if activity remains close to current levels and adequate stipulations are included in this EA to mitigate impacts. Specific attention should be paid to controlling erosion along access routes.

## **Impacts of Alternatives**

### **No Action Alternative**

There would not be any additional effects on fish, wetlands, soil, water quality or riparian vegetation resources under the No Action alternative.

### **Mitigation Measures:**

1. All fertilizers and chemicals used afield will be stored in waterproof containers.
2. Snow machine travel up and down streambeds is prohibited.

3. Boardwalks will be built, used, and properly maintained in areas where repeated trampling will create visible trails, water tracks, or impede vegetative growth.
4. All activities shall be conducted so as to avoid or minimize disturbance to vegetation.
5. Snow machine use is permitted as long as the machine has a gross vehicle weight of less than 1500 pounds, the ground is frozen, and there is an average of six inches of snow cover.
6. All operations shall be conducted with due regard for good resource management and in such a manner as not to change the character or course of any stream, or cause the pollution or siltation of any stream or lake.
7. Scarifying compacted soils and replanting with native vegetation will be required at the soil pit upon completion of digging.

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## **Chapter 5. Tribes, Individuals, Organizations, or Agencies Consulted:**

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No tribes, individuals, organizations or agencies beyond the BLM and the applicant are affected by this proposed action, therefore none were consulted.

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# **Chapter 6. List of Preparers**

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**Table 6.1. List of Preparers**

| Name              | Title                   | Responsible for the Following Section(s) of this Document   |
|-------------------|-------------------------|---|
| Bob Karlen        | Fish Biologist          | Fish, wetlands, soil, water quality, floodplains, greenhouse gas emissions, and riparian vegetation |
| Tom Beaucage      | Realty Specialist       | Project Lead  |
| Tom St. Clair     | Fire Mgmt Officer       | Fuels, Fire Mgmt  |
| Robin Walthour    | Realty Specialist       | Lands and Realty  |
| Bill Hedman       | Archeologist            | Cultural  |
| Dave Parker       | Fish Biologist          | Aquatic ecology   |
| Jennifer McMillan | Ecologist               | Wildlife, Invasives   |
| Darrel VandeWeg   | Geologist               | Geology   |
| Karen Deatherage  | Intepretive Park Ranger | Wilderness  |
| Rebecca Hile      | Hazmat Specialist       | Hazmat  |
| Cal Westcott      | Outdoor Rec Planner     | Visual resources  |
| Michael Schoder   | DSD for Cadastral       | Boundary Risk Assessment  |