

National Science Foundation

*Draft*

**Environmental Assessment**

**Recovery of Archaeological Materials  
from Little Delta Dune Site, Alaska**

CH2M HILL

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# Table of Contents

|   |           |
|---|-----------|
| <b>Introduction .....</b>                                       | <b>1</b>  |
| Background.....   | 1         |
| Purpose and Need.....   | 1         |
| <b>Description of Proposed Action and Alternatives.....</b>     | <b>2</b>  |
| Proposed Action.....  | 2         |
| No Action Alternative .....                                     | 2         |
| Other Considered Alternatives .....                             | 2         |
| <b>Affected Environment and Environmental Consequences.....</b> | <b>3</b>  |
| Resource Areas Not Analyzed in Detail.....                      | 3         |
| Resource Areas Analyzed in Detail.....                          | 5         |
| Soils and Permafrost.....                                       | 5         |
| Water Quality .....   | 6         |
| Sensitive Species.....  | 7         |
| Cultural Resources.....   | 8         |
| Cumulative Effects.....   | 10        |
| <b>Conclusions.....</b>   | <b>11</b> |
| <b>References.....</b>  | <b>12</b> |
| <b>Parties Consulted .....</b>                                  | <b>13</b> |

# Introduction

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## Background

The Little Delta Dune site is a Late Pleistocene-Early Holocene multi-component site within a 2,000-acre inactive dune field in the Tanana Basin, central Alaska. The Little Delta Dune site is near the confluence of the Tanana and Little Delta Rivers on an approximately 20-foot-high linear loess-mantled sand dune. Initial archaeological and geomorphological investigations at the site identified four components in well-stratified contexts, with the oldest component dated to the Late Pleistocene. Subsequent investigations at the site revealed the presence of potentially significant archeological materials that could add substantially to the body of knowledge on the Late Pleistocene archaeology of Alaska.

The Little Delta Dune site was discovered in 2007 during archeological investigations along the route of a proposed 80-mile North Pole-to-Delta Junction rail extension of the Alaska Railroad, which was analyzed in a Final Environmental Impact Statement by the Surface Transportation Board (STB) issued in September 2009 (STB, 2009).

The proposed project is an excavation of this site to meet the Purpose and Need as described below. Because the proposed action involves excavation and would impact a historic property, the project does not qualify for a categorical exclusion under National Science Foundation (NSF) NEPA regulations, as specified at Title 40 of the Code of Federal Regulations Section 640.3. Therefore, this Environmental Assessment (EA) has been prepared to assess the potential environmental impacts of the action. The EA analysis focuses only on resource areas where a potential for substantive environmental impacts could occur.

If allowed to go forward, the excavation will be funded by the NSF RAPID program designed to fund projects that require a quick response. The excavation will be guided by a Memorandum of Agreement between the National Science Foundation and the Alaska State Historical Preservation Office with concurrence from the Healy Lake Tribal Council and the Tanana Chiefs Conference.

## Purpose and Need

The purpose of the proposed project is to conduct an excavation to recover materials from the site that have the potential to contribute significant data regarding the archaeological record of northern North America based on the high scientific value of the materials previously discovered on the Little Delta Dune site.

The need for the proposed project is to recover important archaeological materials from the Little Delta Dune site that have been identified prior to the onset of winter to prevent potential damage to these archaeological materials from natural causes or potential vandalism. An additional need for the proposed project is to add to the body of knowledge on the Late Pleistocene archaeology of Alaska.

# Description of Proposed Action and Alternatives

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## Proposed Action

The proposed action is to recover potentially significant archaeological materials from the Little Delta Dune site near the Tanana River in Alaska. The proposed action includes site access, excavation, recovery of materials, and site restoration.

Site access would be via vehicle and a helicopter ferry. Investigators would drive along the Richardson Highway to a helicopter landing area north of the site. Personnel and equipment would then be ferried across the Tanana River to the site by commercial helicopter.

Investigators would camp at the site during the 3-week recovery effort. All food and supplies would be brought in and all waste would be carried out for proper disposal at the close of the project.

Recovery would involve hand excavation of an approximately 10-foot by 10-foot pit to a depth of up to 15 feet. During recovery, excavated material would be stockpiled adjacent to the work area and covered with plastic sheeting to prevent erosion due to wind or rain. The entire area of temporary disturbance would be less than 300 square feet. The open pit would be covered with plastic sheeting to prevent water from collecting in the bottom should precipitation occur. Once the recovery is complete, the excavated material would be returned to the pit, in sequence so that the developed soil would be returned to the surface.

Recovered archaeological materials would be properly handled, conserved, and curated as described in the project Research Design and Data Recovery Plan: Little Delta Dune Site, and the Memorandum of Agreement (MOA) between the NSF and the Alaska State Historic Preservation Officer (AKSHPO).

## No Action Alternative

Under the no action alternative, the Little Delta Dune site would not be excavated and no archaeological materials would be recovered. The potential would continue for damage or loss of archeological materials from natural causes or vandalism. The no action alternative would not meet the purpose and need of the proposed action, but is analyzed to provide a baseline for comparison of the potential impacts of the proposed action.

## Other Considered Alternatives

Other options considered include delayed recovery of the archaeological materials and partial recovery of the archaeological materials. Neither partial recovery nor delayed recovery is considered a feasible alternative. Partial recovery would risk compromising the integrity of data or materials recovered from the site. Either of these options would result in unacceptable potential for damage to or loss of the archaeological materials, and ultimately the Little Delta Dune site from natural events or vandalism. Therefore, this EA considers the proposed action and the no action alternative and no additional alternatives are considered.

# Affected Environment and Environmental Consequences

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The Little Delta Dune site was included in the general area analyzed in two recently completed Environmental Impact Statements (EISs):

- Northern Rail Extension Final Environmental Impact Statement (STB, 2009)
- Final Environmental Impact Statement for the Renewal of the Federal Grant for the Trans-Alaska Pipeline System Right-of-Way (U.S. Department of Interior Bureau of Land Management [BLM], 2002)

To focus this NEPA analysis on those resource areas with potential for significant impacts as a result of the proposed action, descriptive information and pertinent analyses from these documents are incorporated into this EA by reference, in accordance with 40 Federal Register 55994, Section 1502.21.

## Resource Areas Not Analyzed in Detail

Because of the limited spatial and temporal extent of the proposed action, with a total temporarily disturbed area of less than 300 square feet, there is no potential for significant impacts on multiple resource areas. The following section identifies resource areas that were determined to have no potential for significant impacts and provides a brief explanation for the determination. The analyses that follow are based on material in the two EISs noted above (STB, 2009 and BLM, 2002), which have been incorporated by reference.

**Geology** - The geology of the area would not be affected by the proposed action. The area to be disturbed would be less than 300 square feet and would be above the water table.

**Climate** - The proposed action would have no potential to affect the climate of the region due to small size and short duration of project.

**Air Quality** - Air quality would not be affected by the proposed action. All work would be completed by hand due to the sensitive nature of the cultural artifacts. Minor emissions from vehicles and a helicopter would not cause deterioration of air quality in the region.

**Air Space** - There would be no changes in designated air space. Implementation of the proposed action would have no potential to affect air space.

**Noise** - The proposed action would generate temporary noise. A helicopter would be used to deliver the crew and equipment to the site, which would occur once during the beginning of the proposed project and once upon completion. Excavation would be done by hand and would be completed by September 5, 2010. Minor chainsaw use to clear brush would be completed within 1 or 2 days. Since there are no inhabitants or sensitive receptors in the area, effects from noise would be negligible.

Wetlands – The proposed action would not have potential to adversely affect wetlands in the project area. There are no wetlands at the Little Delta Dune site. Access to the Little Delta Dune site would not impact wetlands.

Floodplains – The proposed action would not have the potential to adversely affect floodplains. Surface contours would be returned to original contours at the close of the project.

Vegetation and Plant Communities – There would be negligible effects on common vegetation and plant communities. Temporary disturbance, including excavation and short-term burial from stockpiling, would be limited to an area of less than 300 square feet. The disturbed area would include a portion of the area disturbed by previous investigations and impacts would be similar. Vegetation and plant communities would recover naturally after soil is replaced.

Fauna – There would be negligible effects on common fauna, limited to temporary displacement during the work. Topography would be returned to original contours at the close of work and natural revegetation would return habitats to their pre-project condition.

Sensitive Ecological Communities – No sensitive ecological communities have been identified at the Little Delta Dune site and there would be no potential to affect sensitive ecological communities.

Utilities – There are no utilities in the project area. There would be no potential to affect utilities due to the proposed action.

Socioeconomics – There would be no impacts to socioeconomics. No permanent jobs would be created or eliminated. There would be no change in population and no change in demand for housing and community services.

Transportation – No transportation infrastructure is within the project area and the project would result in transit of up to four vehicles on the Richardson Highway between Fairbanks and the project area at the beginning and end of the project. The proposed action would have no potential to affect transportation resources.

Human Health and Safety – There would be no potential to affect human health and safety. A health and safety plan has been prepared and would be implemented during the project. The health and safety plan addresses potential risks from the natural environment as well as the additional risk of working in and around an open pit. The work area would be secured to prevent accidental falls into the pit during the work period.

Environmental Justice – The project area is uninhabited. There would be no potential to affect any environmental justice population.

Protection of Children – The project area is uninhabited. There would be no potential to create environmental health or safety risks to children.

Recreation – There would be negligible impacts to recreation due to the small size and short duration of the project. No maintained trails or established recreational areas would be affected. There is abundant open space for outdoor recreation in the area and the temporary loss of potential use from the project area would result in only a negligible impact.

Aesthetics and Visual Resources – There would be negligible temporary impacts to aesthetics and visual resources during the work. Surface contours would be returned to pre-project

conditions at the close of the project and there would be no long-term change to the appearance of the area.

## **Resource Areas Analyzed in Detail**

In addition to other references cited in the following sections, the analyses that follow are based on material in the *Northern Rail Extension Final Environmental Impact Statement* (STB, 2009) and the *Final Environmental Impact Statement for the Renewal of the Federal Grant for the Trans-Alaska Pipeline System Right-of-Way* (BLM, 2002), which have been incorporated by reference.

### **Soils and Permafrost**

#### **Affected Environment**

The Little Delta Dune site is on an approximately 20-foot loess covered linear sand dune. Loess is an unstratified deposit of loam or silt, typically formed by glacial activity and deposited by wind. The top 205 inches of soil in the work area consists of four distinct layers of wind-blown silt and fine-to-medium sands. The surface layer extends to a depth of 78 to 87 inches below the surface and contains A and B horizons typical of modern boreal forests to a depth of approximately 24 inches, with other silts occurring below that. The second layer is a thin layer of sand, averaging less than 4 inches thick, which is underlain by a silt layer approximately 10 inches thick. Below the third layer, sand extends to below 205 inches beneath the surface (Potter et al., 2008). Soil development is limited to the upper 24 inches and permafrost is not present at the Little Delta Dune site.

#### **Environmental Consequences**

##### **Proposed Action**

The proposed action would have negligible impacts on soils. Soil disturbance would be temporary and limited to the work period.

The work site would be accessed by helicopter from a landing area along the Richardson Highway on the opposite side of the Tanana River, so wheeled vehicles would not be operating on the site during work or for access.

Soil within an approximately 10-foot by 10-foot area to a depth of up to 15 feet would be excavated and not replaced for approximately 3 weeks. The excavated material would be stockpiled adjacent to the work area and returned to the pit when work is complete. The exposed soil in the pit and the stockpiled excavated material would be subject to erosion during the work period. However, best management practices (BMPs) to limit soil erosion potential would be implemented. Soil removed by excavation would be covered with plastic sheeting to prevent exposure to the erosive forces of wind and rain during the work period. When activities are not occurring, the pit would be covered with plastic sheeting to prevent exposure to wind and rain. With implementation of these BMPs, any soil erosion would be negligible.

Upon completion of work activities, the excavation pit would be filled with the excavated material, with the strata replaced in sequence, and the topography would be returned to pre-excavation contours. Inert biodegradable mulch would be placed over disturbed soils to limit the erosion potential during the natural revegetation period. Because the soils would be returned to the pit in sequence, there would be no long-term impacts to soils.

Permafrost is not present in the work area, so there would be no potential to adversely affect permafrost.

### **No Action Alternative**

No excavation or travel would occur under the no action alternative. Therefore, there would be no potential to affect soils and permafrost under the no action alternative.

## **Water Quality**

### **Affected Environment**

The nearest receiving water to the Little Delta Dune site is the Little Delta River, a tributary to the Tanana River, approximately 1,400 feet from the site. Smaller streams in the area are fed by groundwater seeps, small side branches, or snowmelt. Larger rivers are glacial fed (STB, 2009).

The Tanana River and the Little Delta River are typical of subarctic glacial rivers. From approximately May through mid-October, the rivers are open flowing and governed by glacial meltwater and major rain events. During this period, the rivers are high-energy systems with braided channels and extremely heavy silt loads and variable bedloads and discharges. During the remainder of the year, these rivers are frozen over and function as moderate-energy, split-channel rivers with low silt loads (clearwater rivers) with stable bedloads and discharges (Durst, 2005).

### **Environmental Consequences**

#### **Proposed Action**

The proposed action would have negligible impacts on water quality.

The site would be accessed by helicopter and no vehicles or equipment would cross or be operated in streams or rivers. Minor quantities of petroleum, oils, or lubricants could enter the Tanana River from vehicles left at the landing area or from the helicopter. Any such incidental leakage would result in a negligible impact on water quality in the Tanana River.

Excavation and backfilling would be done by hand. Because there are no waters in the work area, there would be no potential for direct impacts to water quality. The forest, extending for approximately 1,400 feet between the site and the Little Delta River, would serve as an effective filter for any stormwater runoff leaving the work area and would effectively eliminate any potential for indirect impacts to water quality in the Little Delta River. BMPs would be utilized to further limit erosion and runoff from disturbed soils and to minimize the potential for indirect impacts to offsite waters.

All work would be completed by hand and no machinery or vehicles would be used. The site would be accessed by helicopter. The main pollutant would be sediment from the erosion of exposed soils from the excavation pit. However, the stockpiled soils from the excavation would be covered with plastic sheeting and the excavation pit would be covered with plastic sheeting when not in use. Upon completion of work activities, the excavation pit would be covered with inert biodegradable mulch to limit the erosion potential during the natural revegetation period.

No toxic chemicals or potential chemical pollutants would be used onsite, so there would be no potential for accidental spills adversely affecting water quality.

All work would be done during the open flowing period when silt loads are high from glacial melting. Therefore, even if runoff were to move from the worksite to a river and the intervening

1,400 feet of forest could not assimilate the sediment load, there still would be no indirect impacts to water quality in the Little Delta River or the Tanana River.

### **No Action Alternative**

No excavation or travel would occur under the no action alternative. There would be no potential to affect water quality under the no action alternative.

## **Sensitive Species**

### **Affected Environment**

Habitat at the Little Delta Dune site consists of boreal forest within the Tanana-Kuskokwim Lowlands eco-region. The Little Delta Dune site is within a broadleaf forest dominated by quaking aspen (*Populus tremuloides*) and paper birch (*Betula papyrifera*), with scattered white spruce (*Picea glauca*). Black spruce (*Picea mariana*) and gray alder (*Alnus incana*) occur in the lowlands surrounding the dune.

Clear headwater streams in this region provide spawning areas for Chinook (king), coho (silver), and chum salmon. Groundwater-fed seeps and springs are common and, since they do not freeze in the winter, are able to support salmon and grayling eggs and developing embryos (STB, 2009).

Sensitive species that could occur within and near the Little Delta Dune site have been identified (STB, 2009). The Canada lynx, a BLM sensitive species, is the only mammal species of concern known to occur in the region. There are no federally listed threatened or endangered bird species known to occur at or near the Little Delta Dune site; however, birds of conservation concern have been identified within the interior of Alaska by various agencies and could occur in the vicinity. Migratory birds occur in the area during parts of the year. No Federal or State of Alaska protected, threatened, endangered, or candidate plants occur in the area, although 27 rare plants are known to occur in the area (STB, 2009).

## **Environmental Consequences**

### **Proposed Action**

The proposed action would have negligible impacts on sensitive species. The proposed action would start in mid-August 2010 and be completed by the end of the first week of September 2010. Excavation would disturb approximately 100 square feet and total disturbance, including stockpiling of excavated material, would be less than 300 square feet. The Little Delta Dune site would be returned to original topographic contours and allowed to naturally revegetate upon completion of the proposed action.

The Little Delta Dune site would be accessed by helicopter, eliminating the potential for wheeled or tracked vehicles to disturb habitat or sensitive flora. The helicopter could temporarily disturb sensitive fauna and could interrupt foraging activities, but its use would be limited to the beginning and end of the project and any such disturbance would be minor. Animals could forage in other areas, as there is ample similar habitat in the area, and animals would be expected to resume use of the area upon completion of the proposed project.

Migratory birds will have completed nesting and rearing of young by the time this work is conducted. No impacts to nesting and rearing would be expected. Any birds remaining in the area would be staging for migration at the time of work. These birds may be displaced to other nearby habitat from the human activity, but any impact would be negligible.

## **No Action Alternative**

No excavation or travel would occur under the no action alternative. Accordingly, there would be no potential to affect sensitive species under the no action alternative.

## **Cultural Resources**

### **Affected Environment**

The Little Delta Dune site was discovered in 2007 during archeological investigations along the route of a proposed 80-mile North Pole-to-Delta Junction rail extension of the Alaska Railroad, (STB, 2009). There are no known historic cultural resources at the Little Delta Dune site, but archeological resources have been collected from the site during initial investigations.

The Little Delta Dune site is a Late Pleistocene-Early Holocene multi-component site on an approximately 20-foot-high linear loess-mantled sand dune within an inactive dune field in the Tanana Basin, central Alaska. Initial archaeological and geomorphological investigations at the site identified four components in well-stratified contexts, with the oldest component dated to the Late Pleistocene.

Component 1 from the site consists of 17 tertiary chert flakes and 320 faunal fragments directly associated with a hearth feature calibrated to date to 13,269–13,124 years before present. Animal specimens included long bones and phalanges from various waterfowl, tooth enamel from a large artiodactyl (such as bison or moose), small mammal remains, and a medium-sized canid upper P4 tooth. Specimens were fragmented and interspersed among the lithics and hearth charcoal. The collected data correspond to the nearby Broken Mammoth CZ4 faunal assemblage that dates to the same time period (Potter, et al., 2008).

Subsequent investigations at the site have revealed the presence of potentially significant archeological materials that could add substantially to the body of knowledge on the Late Pleistocene archaeology of Alaska.

## **Environmental Consequences**

### **Proposed Action**

The proposed action includes the excavation and recovery of archaeological materials, which constitutes an adverse impact to these resources as defined under the National Historic Preservation Act and contemplated under NEPA. Because the proposed action would result in an adverse impact to these resources, this analysis focuses on the mitigation proposed for the unavoidable impacts resulting from recovery.

The NSF would mitigate the adverse effects to the historic property known as the Little Delta Dune site through a program of data recovery combined with dissemination of information, including full documentation of destructive archaeological activity.

An MOA between the NSF and the AKSHPO, dated May 12, 2010, was developed to allow archaeological investigation and excavation of the Little Delta Dune site and included the following mitigation activities:

- Data recovery activities shall locate, recover, and document significant archaeological information at the site.

- The data recovery work will be in accordance with a research and data recovery plan, in compliance with the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation [As Amended and Annotated]* (National Park Service, 2010) and *Treatment of Archeological Properties: A Handbook* (Advisory Council on Historic Preservation, 1980).

The MOA was agreed upon and executed by the AKSHPO and concurred with by tribes with interest in this area. Initial investigations at the Little Delta Dune site complied with these mitigation requirements. However, the discovery of additional potentially significant archaeological materials necessitated additional consultation. NSF, the AKSHPO, and Tribal consulting parties, including local federally recognized Tribes, were notified and the subsequent consultation resulted in an amendment to the MOA, which is in the process of being signed by all interested parties. The amendment specifies additional mitigation measures as set forth below:

- The lead agency will facilitate the Tribal community's plan to perform a ceremony or observe a cultural protocol to show their respect, as appropriate, to any significant historic properties found in their traditional lands.
- Immediately preceding the recovery effort, a pre-excavation meeting will be convened among signatories to explain the scientific methods and treatment of the archaeological materials to gain a mutual understanding.
- Standard archaeological methods will be used as specified in the original research design prepared for the project and supplemental methodologies supplied to the funding agency.
- All materials collected will be secured in an environmentally controlled storage repository where access will be limited to project personnel, Tribal officials, authorizing agents, and other professionals.
- A sufficient amount of ground will be removed to recover all archaeological materials associated with the discovery to protect them from vandalism.
- Tribal and State officials will be notified at least 14 days in advance of work and the lead federal agency will provide transportation to the site for these officials for the opportunity to observe the recovery procedure.
- Determining the types of scientific analysis and final disposition of the archaeological materials will be deferred to a later phase of consultation among the signatories, invited signatories, and concurring parties.

All of the stipulated mitigation measures will be implemented. Should additional, unanticipated potentially significant archaeological materials be discovered during the recovery effort, appropriate agency and Tribal notifications will be made and additional consultation will be conducted.

### **No Action Alternative**

Under the no action alternative, archaeological materials from the Little Delta Dune site would not be recovered. These potentially significant archaeological materials and the Little Delta

Dune site as a whole would remain at risk to natural events and vandalism, with a substantial potential for significant adverse impacts to a historic property.

## **Cumulative Effects**

The Alaska Railroad Northern Extension, operation of the Trans-Alaska Pipeline, possible maintenance or upgrades to the Richardson Highway, and ongoing operation of Fort Wainwright are the only projects with potential to interact with the proposed action to create cumulative effects. However, because impacts from the proposed action would be confined to the immediate project area, would be negligible, and would cease when the project is complete, there would be no interaction between the proposed action and any of these other actions. No cumulative effects would be likely.

# Conclusions

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Implementation of the proposed action would result in adverse impacts to a historic property. Mitigation is proposed that would reduce these adverse impacts such that they should not rise to a level of significance under NEPA. No other potentially significant impacts would result, as other resource areas would either not be affected or the effects would be negligible.

# References

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Advisory Council on Historic Preservation. 1980. *Treatment of Archeological Properties: A Handbook*. Washington, DC.

Durst, J.D. 2005. *Fish Habitats and Use in the Tanana River Floodplain near Big Delta, Alaska, 1999-2000*. Technical Report No. 01-05. Alaska Department of Fish and Game.

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# Parties Consulted

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Judith Bittner  
Alaska State Historic Preservation Officer

Healy Lake Tribal Council  
JoAnn Polston, First Chief, Healy Lake Tribal Council

Tanana Chiefs Conference  
Jerry Isaac, President and CEO, Tanana Chiefs Conference