

Statement of Work

Title: Development of a Long-term Ecological Monitoring Program (LTEM) for Denali National Park and Preserve as a Prototype for Subarctic National Parks:

Incorporating Previously Studied Vegetation Plots into the LTEM Framework and Understanding Successional Trajectories in Glacial Floodplains

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Background:

The National Park Service (NPS) has begun an Inventory & Monitoring Program, to better understand the natural resources under their protection and to detect changes in those resources. In this context, the U.S. Geological Survey, Biological Resources Division (BRD), Alaska Biological Science Center is working with Denali National Park and Preserve (NP&P) to develop a prototype Long-term Ecological Monitoring Program (LTEM) suitable for national parks in the subarctic. One of BRD's primary roles in the Denali LTEM program is development of objectives and protocols for monitoring vegetation change. An important step in developing objectives for vegetation monitoring is a synthesis of existing knowledge about patterns and rates of change to be expected. Various vegetation studies have been conducted in Denali in the past 50 years, and revisits of these plots (if they can be relocated) may yield important information about vegetation change in Denali ecosystems.

One of the most important of the previous vegetation studies was the Ph.D. dissertation work of Dr. Leslie A. Viereck on Muldrow Glacier outwash terraces during 1956 and 1958. This study used a chronosequence approach to develop a trajectory of vegetation change on glacial outwash plains, which are significant habitats in Denali National Park and Preserve. Plots were established on four terraces of different ages, ranging from the pioneer stage (25-30 years old) to the late shrub stage (200-300 years old). These successional stages were compared to each other and to nearby climax tundra (thousands of years old) in terms of plant species cover and soil development. Dr. Viereck's work was published as a Ph.D.

thesis¹, and later as a paper in Ecological Monographs².

The Denali LTEM program would like to document the location of Dr. Viereck's Muldrow Glacier plots for revisits at various intervals in the future. To relocate the plots will require Dr. Viereck to go through his original field notes and photographs to prepare for a field trip to find the plots. If we can find the plots, collection of data and photographs to document their current status would allow Dr. Viereck to document and revise our understanding of the successional trajectory in glacial outwash habitats. The amount of time that has passed since the original field work (42-44 years) is about the difference between the three early stages in the inferred chronosequence. Current data would provide a unique opportunity in ecology to verify a chronosequence. Revisiting the plots will help the LTEM program select an appropriate time scale for revisits of vegetation plots, and help us better envision the types of changes that are most important for the monitoring program to detect.

This contract will provide for (a portion of) Dr. Viereck's time to prepare for and conduct the field work necessary to relocate and remeasure the plots and interpret the current data. Because of Dr. Viereck's great personal interest in revisiting the Muldrow plots, he is willing to contribute considerable time to this project without compensation.

Goal: Development of a long-term ecological monitoring program at Denali National Park and Preserve as a prototype for national parks in the subarctic. This contract will help meet this goal by providing information useful for development of objectives and protocols for vegetation monitoring.

Objectives:

1. Re-locate vegetation plots established by Dr. Leslie A. Viereck in Denali National Park in 1956 and 1958 in the vicinity of the McKinley and Thorofare Rivers and get GPS coordinates so the plots may be incorporated into the LTEM program for revisits as appropriate.
2. Re-measure according to the original methods and photograph the vegetation plots established by Dr. Leslie A. Viereck.

1 Viereck, L.A. 1962. Plant succession and soil development on gravel outwash of the Muldrow Glacier, Alaska. Ph.D. Thesis. University of Colorado. 145 pp.

2 Viereck, L.A. 1966. Plant succession and soil development on gravel outwash of the Muldrow Glacier, Alaska. *Ecological Monographs* 36(3):181-199.

3. Report the changes in the vegetation of the plots since the original measurements and discuss the apparent successional trajectories and their significance to the understanding vegetation change in Denali.

Tasks:

1. Summarize and synthesize existing data and photographs.
2. Conduct field work (summer 2000)
3. Compile and analyze data and write reports.

Deliverables:

1. A summary report of existing data and photographs with detailed description of each of the sites and a plan for field work including a prioritization of the sites to be visited. Due: April 15, 2000.
2. Final report to include:
 - a. Site locations (with GPS coordinates).
 - b. Description of each site with summarized field data and photographs.
 - c. Successional trajectories at each site.
 - d. Overall discussion of successional trajectories on the McKinley and Thorofare Rivers

Due: April 15, 2001

Estimated Budget:

Plant Ecologist	\$20/hr ³	400 hours	\$8,000.00
Technician	\$15/hr	33 hours	495.00
Supplies			2,000.00
Travel (2 trips to Denali from Fairbanks)			
POV miles (240 miles RT to park hq x .31/mile)			150.00
Hotel (2 nights)			200.00
Full Per Diem rate (3 days)			300.00
Field Per Diem rate (2 wks)			50.00
TOTAL			\$11,195.00

³ Note: Dr. Viereck is charging half his normal rate as a benefit to the government.