

Statement of Work

Title: Development of a Long-term Ecological Monitoring Program for Denali National Park and Preserve as a Model for Parks in the Subarctic

Contractor: Dr. Lyman McDonald
Western Ecosystems Technology, Inc.
2003 Central Avenue
Cheyenne, WY 82001

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, 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 roles in development of the Denali LTEM program is to ensure that the recommended program is statistically-sound. Resolution of statistical issues at the outset of an LTEM program is especially important because of the long time periods over which data will be collected and the associated cost. Failure to address the statistical issues associated with long-term monitoring could result in much wasted effort and expense by the NPS, and the NPS might fail to detect important changes to park resources. Because the Denali LTEM program is being developed as a prototype for other parks in the subarctic, it will serve as a model to the 14 other units in the National Park System within the Alaska. Therefore, it is particularly important that the Denali program be statistically-sound.

Goal: Development of a prototype long-term ecological monitoring program suitable for national parks in the subarctic that is ecologically-relevant, statistically-sound and cost-effective. This contract will help meet this goal by providing the statistical review necessary to ensure that the LTEM program has appropriate study design and statistical power to detect important ecological changes.

Objectives: Provide recommendations to the USGS-Alaska Biological Science Center Denali LTEM Coordinator regarding statistical analysis and interpretation for the LTEM program and its individual components.

Tasks:

1. Review data, study plans, reports and draft protocols for the Denali LTEM program as they are produced by the Principal Investigators to provide recommendations concerning statistical issues, particularly study design and statistical power.
2. Meet with the USGS-Alaska Biological Science Center Denali LTEM Coordinator and other Denali LTEM Principal Investigators as needed to discuss recommendations and study design issues.

Deliverables:

1. Reports providing review comments and recommendations concerning statistical issues for the Denali Long-term Ecological Monitoring program on data, study plans, reports and draft protocols. The following reports are in hand or will be ready for review soon:
 - a. E. Rexstad and E. Debevec. April 1999. Power and cost considerations for small mammal monitoring. 17 pp. Due Date: August 1, 1999.
 - b. E. Rexstad and E. Debevec. February 1999. Draft study plan for synthesis and integration: Denali Long-term ecological monitoring. 5 pp. Due Date: August 1, 1999.
 - c. S. Conn and S. Milner. May 1999. Draft Study Plan. Design of methods for detecting change in aquatic invertebrate populations and lotic communities. ~ 40 pp. Due Date: September 1, 1999.
 - d. D. Helm. April 1999. Draft Study Plan. Program design for detection of vegetation change. ~ 30 pp. Due Date: September 1, 1999.
 - e. Microage. March 1999. Data management recommendations. 2 pp. Due Date: August 1, 1999.
2. Reviews of other documents, reports, data, and protocols are anticipated. Deliverables (reports) will be due 30 days after receipt of the document to be reviewed by the contractor.

Budget

<u>Statistical Advice</u>	<u>Rate</u>	<u>Hours</u>	<u>Total</u>
Senior Biometrician	90	100	9,000
Research Biometrician ⁷⁵	125	9,375	
<u>Travel</u>	<u>Cost/trip</u>	<u># travelers</u>	
Trip 1 (fall 1999)	1,500	2	3,000
Trip 2 (spring 2000)	1,500	2	3,000
Direct Expenses			400
Long Distance phone/fax			100
Shipping			50
Copying			50
			<hr/>
		TOTAL	\$24,975

Period of Performance: July 1, 1999 to September 30, 2000.

Billing: Contractor will bill for the number of hours actually worked, on a monthly basis.