Integrating the Denali Long-Term Ecological Monitoring Program (prototype) into the Central Alaska Network Vital Signs Monitoring Program

Submitted to the Washington Support Office by the
Central Alaska Network Board of Directors
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Executive Summary

This document describes a plan for fully integrating the Denali Long-term Ecological Monitoring Program into the Central Alaska Network (CAN) Vital Signs Monitoring Program. The major features of this plan are that:

- A recognizable prototype LTEM program at Denali is retained, but within the framework of scientific and administrative decision making, oversight and management of the NPS Vital Signs Monitoring program.

- The CAN Board of Directors will be the decision making body for the integrated program.

- The CAN Coordinator will be overall leader of the integrated program. The Denali LTEM Program Manager position will shift focus to concentrate on activities that will facilitate implementation of the integrated program, especially during this transitional phase.

- The development of the monitoring plan for the integrated program will follow the 7-step, 3-phase approach required of vital signs monitoring networks. Thus a single monitoring plan, covering both the network and prototype efforts will be developed. Similarly, a single data management plan will be developed and implemented for the integrated program. The CAN timeline will be followed. A single Annual Administrative Report and Work Plan will be prepared.

- We propose that the $485K currently provided to Denali LTEM on an annual basis continue on an annual basis, following the NRPro model. The portion of the $485K currently needed to support permanent positions with Denali LTEM will remain at Denali. The remaining funds will come to the network and will be used with other monitoring funds to accomplish the integrated monitoring program under the discretion of the CAN Board of Directors.

Introduction

Steve Fancy, National Monitoring Program Coordinator, visited Denali April 4-5, 2002 to discuss the park's preparations for a planned Long-term Ecological Monitoring (LTEM) Program Review scheduled for later this year. The Denali visit was held in conjunction with the Central Alaska Network (CAN) Scoping workshop, April 3-4, 2002. During discussions over the entire week, a consensus emerged to more fully integrate the LTEM program with the network's vital signs monitoring program than was previously contemplated. All parks in the network have striven to integrate the two programs all along, however, we now have a more complete understanding of what that integration might entail. Fully integrating the programs best ensures that sound monitoring is efficiently accomplished meeting the needs of the parks involved and following the requirements of the Washington Support Office (WASO) Inventory and Monitoring Program.

Accordingly, the National Monitoring Program Coordinator subsequently requested that the network and the Denali develop a formal document that describes the integration between the two programs. Thus this document provides background information on the Denali LTEM and CAN programs and a summary of their current status. The impetus for integration, our overall integration strategy, and its implications are explained. Specific plans for managing the integrated program are also described. This document was developed during April and May 2002, and involved substantive discussions of the CAN Board of Directors, CAN Technical Committee, the Denali LTEM staff, the Regional I&M Coordinator and Science Advisor, and USGS-Alaska Science Center Liaison. This plan is forwarded to the WASO I&M program leaders to communicate our vision and seek support of this approach.

Integration Strategy

During the CAN Scoping Workshop and subsequent visit of the National Monitoring Program Coordinator with Denali LTEM staff, the advantages of a stronger integration of Denali into the CAN program became clearer. Denali LTEM staff were playing key roles in development of the CAN program, but it was obvious they could not both prepare for the Denali review (See Background section) and keep up the pace of work required to fully participate in CAN. The documents that were required for the Denali review were essentially the same documents needed by CAN, but completing them for Denali alone would be duplicative, potentially confusing, and could lead the two programs further apart in their development. In addition, staff turnover and delay in filling the data manager vacancy for the Denali LTEM program had precluded making progress on the data management plan, one of the key documents required by WASO. These factors led to a convergence of thought that developing a plan for fully integrating the Denali LTEM program into the CAN would benefit both Denali and the network. The key advantages would be to:

- avoid staging duplicative and possibly confounding conceptual planning efforts at the same time;

- to bring Denali's data management effort up to required standards following the guidance of the CAN Data Manager;

- avoid the alternative of completely severing the Denali program from the network, in which case the network loses significant participation by key Denali LTEM staff in the areas of physical sciences, vegetation and wildlife.

It is the similarity of approaches contemplated and the particular stage of development within each program that provides the opportunity to fully integrate into a single, cohesive monitoring program for the parks in the Central Alaska Network. A summary of remaining tasks to be accomplished and who is responsible are provided in subsequent sections of this document.

The main features of the integration strategy are these:

- The network and LTEM programs will develop a single Monitoring Plan and single Data Management Plan encompassing the entirety of monitoring within network parks, regardless of funding source (e.g. vital signs, prototype, water quality, and park base funds). The content of, and timeline for developing the monitoring and data management plans will conform to the 3-phase approach guidance provided networks by WASO I&M. The successful implementation of this approach provides for continuing prototype status while avoiding duplicative effort in conducting separate planning processes and preparations for a program review at this time with overlapping timelines. This approach is also in full conformance with one of the intentions of the Vital Signs Monitoring Program which is to bring all monitoring efforts, regardless of funding source, under a single umbrella. Bringing all monitoring efforts into a unified program of accountability, data management and reporting, is seen as critical to the NPS's overarching goal of protecting park resources, based on sound science.

- The Denali LTEM program has worked over the last few years to strengthen the program by moving to a more extensive sample design for certain aspects of the program. This approach is consistent with the approach developed during the network scoping process, which combines extensive level monitoring that will be accomplished in all three parks in a unified fashion, and intensive level monitoring that will likely be more park-specific or issue driven. This approach provides flexibility to parks in developing aspects of the program specific to them. This framework of extensive and intensive efforts within the network is the premise upon which the integrated program can be built.

Prototype-Network Integration Implications: What will change, what will not change

There will continue to be a recognizable prototype program within the umbrella of the network vital signs program. The Denali LTEM program is expected to continue to serve as a center of excellence for other parks. As a prototype park, Denali is expected to provide assistance in the design, development, and testing of monitoring protocols and methods, and for providing instruction in the use of those products to other parks in the network.

Two primary changes will take place in the Prototype-Network Integration:

1. The overall leadership and management of the Denali LTEM program will be brought into the framework of the Vital Signs Program; and

2. The decision process for program direction and decision making will occur in a unified manner. Specifically the Denali LTEM Prototype Program Manager will work within the framework of the leadership provided by the CAN Coordinator, the Regional I&M Coordinator and the National Monitoring Program Coordinator. Thus, the Denali LTEM Prototype will not exist in isolation, but will exist fully in the context of the Vital Signs program. Also, decisions regarding program direction will be made via recommendations of the Technical Committee to the Board of Directors for final approval.

The framework provided by the Vital Signs program includes the following critical concepts:

- The national level (WASO I&M team) will continue to provide clear guidance on the steps to program development and at least minimum standards as to accountability. The national level will take a strong role in developing standards and mechanisms that benefit all networks (e.g., data management guidelines). Heretofore, guidance from the national level to Denali and other prototypes was more general. This was related to the overall purpose of the prototype program, which was to experiment with ways of effectively monitoring resources, thus general guidance, allowed the greatest flexibility in program development. The lessons from the prototypes have been very useful in the creation of the Vital Signs program, by teaching us what the national level guidance should be. In any case, for Denali LTEM program, being brought under the guidance of the national program will be a "change" which is reflective of the maturation of the NPS monitoring program and to which Denali's efforts over the past 10 years has contributed significantly.

- The regional level (Alaska Region I&M Coordinator, supported by the Regional Science Advisor) will take a stronger role in ensuring that work at the network level is consistent with national level guidance and makes sense for the unique situation of Alaska parks. Reviewing and approving reports and work plans prior to submittal to

WASO will accomplish this. Peer review of technical reports and the monitoring plan will be arranged and implemented at the regional level. The regional level will also play a critical role in facilitating the development of monitoring procedures that benefit all Alaska networks (e.g., collection, analysis and interpretation of remote sensing data). Heretofore, there has not been a regional presence in the oversight of the Denali LTEM program, so this will also be a new feature of overall program management. Again, this will benefit Denali and all the Alaska Networks by facilitating transfer of information among networks and by providing regional leadership.

- The next level of accountability for the Denali LTEM prototype program will reside at the network level. The network will provide a home for the Denali LTEM prototype program. Because the prototype will exist within the network program, decisions about its future direction will be made by the network and reflect the needs of Denali, in the context of the network. This is a change because Denali has previously only had to consider objectives that met Denali needs. But, for Denali to truly act as a prototype for other subarctic parks (which continues to be its mission as a prototype), Denali must now be responsive to the needs of WRST and YUCH. Thus, Denali being a prototype must now move from an abstract concept to a real concept. The only way to do this is for the Denali program to exist fully within the network paradigm. There will still need to be strong leadership at the park level, but that leadership must now be aligned with the leadership at the network, regional and national levels.

Management, Accountability and Administration of the Integrated Program

Management

At a May 9, 2002 meeting, the CAN Board of Directors agreed that the Board, with input from the Technical Committee through the Network Coordinator, would be the single decision making body for the integrated program. In addition to approving the Monitoring Plan, the Board will review and approve the Annual Administrative Report and Work Plans, described below, which describe work occurring under all aspects of the program. The Network Coordinator, with significant help from the Technical Committee, will be responsible for developing the Monitoring Plan and the annual reports and work plans. The Technical Committee is responsible for providing technical input and professional support, for providing park management perspective and for guiding the development of a program that provides for the strongest monitoring program possible for all parks in the network. While all parks in the network make significant contributions to the effort, the Denali program is expected to continue to provide high levels of input in the development and implementation of the program as is required of a prototype park. The success of the integrated program rests largely on the continued appropriate contribution

of all parties involved.

Annual Administrative Report and Work Plans are required by WASO for the Network vital signs program, the water quality monitoring program and the prototype program. Rather than develop separate reports and work plans, we propose, beginning with FY03, to develop a single report and work plan that describes all these activities in a way that shows the integrated program yet distinguishes among program areas with separate project statements and budget statements. The AARWP is to be signed by the Board of Directors, and submitted through regional offices to WASO I&M.

The CAN Network Coordinator will be primary leader of the integrated program. The Denali LTEM Program Manager position will be retained as a permanent position at Denali, however the duties of this position will be changed as needed to support the integrated program. During FY 2003, the highest priority for the Denali LTEM Program Manager position will be to support the transition to an integrated program, by working closely with the CAN Coordinator, Technical Committee and Board to troubleshoot and resolve issues as they arise. This position will also play a significant role in development of Phase I and Phase II reports (both due during FY 2003), and will be the lead on completion of the Denali LTEM 11-year History Report (also due in FY 2003). Most importantly, this position will also retain responsibility for the coordination of activities at Denali associated with the prototype aspects of the integrated program. The Denali LTEM Program Manager will work closely with the CAN Data Manager to strengthen the reporting mechanisms of the Denali LTEM prototype and the network.

Staffing

The staffing plan for the integrated monitoring program is built around the following strategies:

1. Dedicated network staff will include the Network Coordinator and Data Manager.

2. The scientific expertise of existing park resource personnel is a critical and indispensable part of the integrated program. Existing staff will contribute their time and scientific expertise to the network, with expectations of the percentage of time that will be contributed to be formalized through performance plans.

3. Network funds may be used to hire support staff for existing park personnel to facilitate their ability to contribute to integrated program development and operation.

4. Any new permanent staff with professional-level resource expertise to be hired with network funds will work for the Network Coordinator and be based at one of the CAN parks.

5. When vacancies occur in permanent positions with significant roles in the integrated program, current program needs will be considered by the Technical Committee and Board of Directors and a recommendation concerning replacement decisions made to the hiring official.

Table 1. Permanent and term NPS employees currently supported with I&M funds, the percentage of their time dedicated to the integrated CAN program, and funding source for base salaries. WASO previously transferred a portion of the I&M to Denali base.

Permanent and Term Positions	Name	% time dedicated to integrated monitoring program	Salary funding source
Network			
Coordinator	Maggie MacCluskie	100%	CAN
Data manager	Doug Wilder	100%	CAN
Denali-based			
LTEM Program Manager	Susan Boudreau	100%	Denali LTEM funds previously transferred from WASO to Denali base
Physical Scientist	Guy Adema	100%	Denali LTEM
Database Manager (6 mos. term)	Olga Helmy	100%	Denali LTEM
Environmental Specialist	Pam Sousannes	100%	Denali LTEM
GIS Coordinator	Jon Paynter	100%	Denali LTEM funds previously transferred from WASO to Denali base
Office Assistant	Janie Lasel	50%	Denali LTEM

Table 2. Base-funded permanent NPS employees that currently contribute to the monitoring program. The percentage of time contributed will be formalized in their performance plans. Positions supported with I&M funds previously transferred to Denali base are shown in Table 1.

Permanent and Term Positions	Name
Denali-based	
Chief of Resources	Susan Boudreau (Acting)
Plant Ecologist	Carl Roland
Wildlife Biologist (Ornithologist)	Carol McIntyre
Wildlife Biologist (Mammalogist)	Vacant
Air Quality Specialist	Andrea Blakesley
Research Administrator	Lucy Tyrrell
Curation	Jennifer Wolk
Administration	Gina Moreno
Wrangell-St. Elias-based	
Chief of Resources	Devi Sharp
Geologist	Danny Rosenkrans
Wildlife Biologist	Mason Reid
Botanist	Mary Beth Cook
Fisheries Biologist	Eric Veach
Yukon-Charley-based	
Chief of Resources	Tom Liebscher
Wildlife Biologist	John Burch
Wildlife Biologist	Nikki Guldager
Wildlife Biologist	Jim Lawler
Aquatic Ecologist	Vacant

Budget

The integration we propose between the two programs also encompasses finances. Monitoring funds are available from several sources; including:

- $485,000 from Denali LTEM,
- $150,000 previously transferred to DENA base in support of Denali LTEM,
- $730,000 from I&M vital signs monitoring in CAN,
- $98,000 from water quality monitoring in CAN,
- other programs such as PrimeNet,
- Park base funds.

We propose that the $485K currently provided on an annual basis by WASO I&M

continue on an annual basis, following the NRPro model. The portion of the $485K currently needed to support permanent positions with Denali LTEM will remain at Denali. The remaining funds will come to the network. These, and the network funds, will be used to accomplish the integrated monitoring program under the discretion of the CAN Board of Directors.

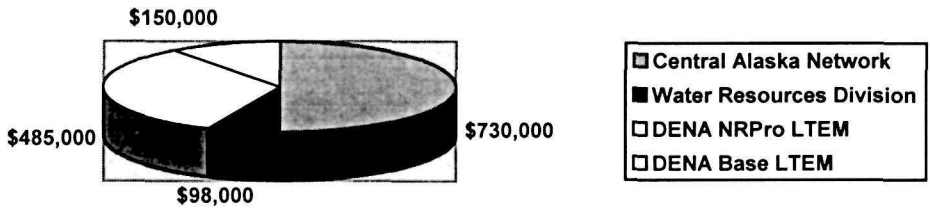

Figure 1. Composition of funding sources available for the integrated CAN and Denali LTEM program.

Tasks and Timeline

Tasks that must be accomplished by the Vital Signs Monitoring Program are described in the 3-phase approach memo of May 3, 2002. Denali LTEM, as a fully incorporated program, will follow this approach as well. The CAN Charter specifies that a draft monitoring plan will be developed by May 30, 2003, about a year in advance of the national requirement. Meeting this ambitious goal provides a means of maintaining the momentum gained during the network scoping meeting and finalizing a plan that will allow field work to be conducted next field season. In addition to the goals specified for the vital signs program, we envision developing several other documents regarding the Denali LTEM program which will guide this year's work and summarize accomplishments of the program thus far. These milestones are briefly described below, with anticipated completion dates and responsible parties specified.

Revise Denali LTEM FY02 Work Plan. The FY02 Work Plan that was submitted to WASO in October did not reflect planned changes to the program that were developed at meetings during October – December, 2001. The Work Plan describes those protocols that are nearing completion and when they will be finalized. The Plan also describes which fieldwork will proceed this summer and which will be discontinued as a result of the planning effort late last year. These changes planned by the LTEM program are consistent with the approach developed by the network, thus facilitating integrating the programs immediately. Completion date: June 30, 2002. Leads: LTEM Program Manager.

Phase 1 Report – Compilation and Summarization of Existing Information. This is the first required interim product of the 3-phase approach for developing Vital Signs Monitoring Programs. The report will summarize results of the work identifying, evaluating and synthesizing existing data and understanding of the park ecosystem; developing draft conceptual models; and present general goals and objectives of the monitoring. The report will draw upon the material already developed and presented in the Denali Conceptual Design. Completion date: September 1, 2002 to Alaska Region, October 1, 2002 to WASO. Leads: Network Coordinator, USGS Liaison.

Complete Mini-Grid Pilot Study Report. A report is in preparation by Denali LTEM staff and USGS to summarize work to date on development of a two-stage systematic design for detecting ecological change at the landscape scale. The report lays out the rationale for the design, results of pilot field studies of vegetation, landbirds and selected mammals, and simulations of revisit plans. Completion date: December 31, 2002 to Alaska Region. Leads: Carl Roland, Carol McIntyre, and Karen Oakley.

Complete Denali 11 year history report. This report will review the history of the Denali LTEM program to provide a convenient summary of the main lessons learned about monitoring program design and operation, and about the Denali Ecosystem and detection of change. Completion date: December 1, 2002. Leads: Denali LTEM staff and USGS Liaison.

Phase 2 Report This document, as specified in WASO guidance, will update and expand upon the material in the Phase 1 report. It will also include the results of the scoping workshop and identify and prioritize potential vital signs for the monitoring program. Completion date: April 1, 2003. Lead: Network Coordinator.

Draft Monitoring Plan. This document will provide the framework of the monitoring program. It will include and expand upon the material in the Phase 1 and 2 reports, and add the overall sample design, data management plan, plans for analysis and reporting, and protocols for those vital signs that will be monitored starting in 2003. Completion date: May 30, 2003. Lead: Network Coordinator.

Background and Current Status of Each Program

Denali LTEM Program

In 1991, the NPS selected several parks representing different biogeographic provinces, to serve as prototypes for development of Long-term Ecological Monitoring programs. Denali National Park and Preserve was one of these prototypes, chosen to test methods for monitoring in subarctic parks. In developing its program over the last 11 years, Denali has worked closely with the U.S. Geological Survey-Alaska Science Center, on both the conceptual framework and specific protocols.

The original design of the Denali LTEM program took what was called "a watershed approach." Monitoring effort eventually was to have been allocated among 5 major watersheds spread throughout the park. Due to logistical and financial considerations, however, monitoring focused primarily on a single watershed near park headquarters—Rock Creek. Whether this intensive monitoring effort at a single site would provide data to address important resource preservation concerns of such a large park became a significant question. A national review of Denali LTEM in 1995 lead to a major re-evaluation and overhaul of the program's objectives and design.

Recent efforts have focused on reframing the objectives of the Denali LTEM program and exploration of the feasibility of probability-based sampling designs that include the entire park in the sampling frame. In 2000, a new conceptual document was published outlining the new direction of the program, and WASO indicated their intention to schedule another national review to evaluate Denali's readiness for full program implementation.

In May 2001, WASO notified Denali that the review would occur in the fall of 2002. In the May 2001 memo, WASO observed that while the conceptual document represented a major milestone in setting forth the goals of the program, several critical components of the overall program design had not been completed. These areas included: (1) identification of specific, measurable objectives for each program component, (2) prioritization of monitoring components and allocation of funding and personnel based on the priorities, (3) creation of a sampling design allowing inferences to made to larger areas than those sampled, and (4) implementation of a sound data management plan. WASO also spelled out the specific documents that needed to be available prior to the review. These included a monitoring plan, data management plan, and protocols. In the May 2001 memo, WASO asked that Denali provide a memo within a few months describing the process and timeline for completing the remaining steps of the design phase. Denali responded in January 2002, however this document did not persuade WASO that all required tasks were on target for completion in time for the fall 2002 review. Uncertainty about progress towards the review led the National Monitoring Program Coordinator to schedule the aforementioned site visit for the specific purposes of determining Denali's readiness.

Central Alaska Network Vital Signs Monitoring Program

The Central Alaska Network was established in February 2001 with the signing of its' Charter. The present hierarchy of the Network is as below (Fig. 2):

> *Board of Directors* - Composed of the Superintendent of each park. The Regional I&M Coordinator and Regional Science Advisor serve as advisors to the Board of Directors. The Network Coordinator serves as staff to the board. The Board makes all final decisions regarding the program.
>
> *Technical Committee* - Members include 3 representatives of each park (including the Chief of Resources), the Regional Inventory and Monitoring Coordinator, the

Regional Scientific Advisor, a Regional Hydrologist, a USGS Biological Resources Division liaison and is chaired by the Network Coordinator (14 total members). The Technical Committee directs the conceptual approach and design of the monitoring program. Decisions are made in a consensual manner.

Work Groups - Provide technical level expertise for design and methodology questions. The Technical Committee has identified four work group areas; Physical, Aquatics, Flora, and Fauna (4-8 members, group dependent).

Members of each organizational level are detailed in the Appendix of this document .

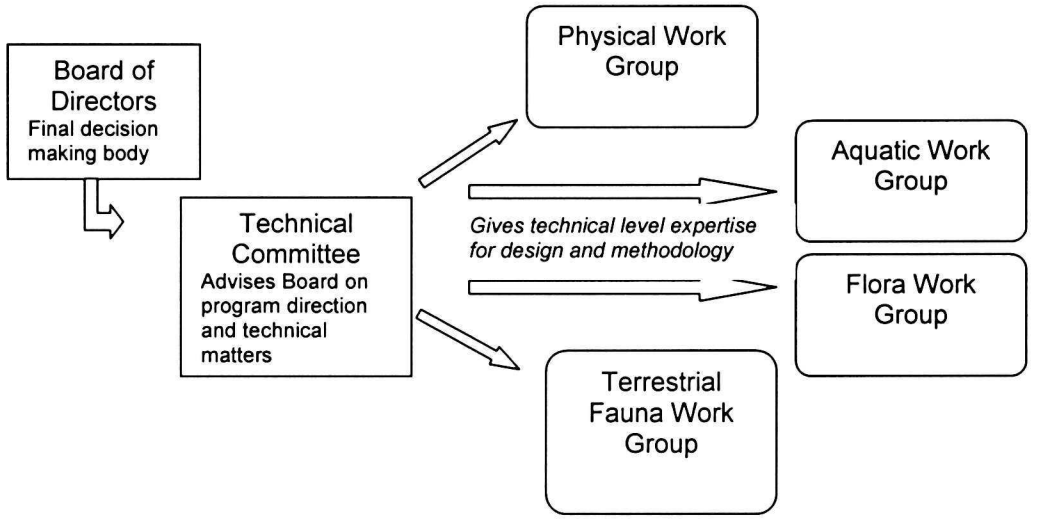

Figure 2. Organizational structure of the Central Alaska Network

The CAN has made significant progress on several aspects of the Monitoring Program since the signing of its Charter. The Network Coordinator was hired and began work in June 2001. The Technical Committee was appointed and approved by the Board of Directors in July 2001. The Technical Committee began meeting regularly in August 2001 and initiated preparation for the Scoping Workshop. The Scoping Workshop was held in April 2002 and the report from the workshop is being compiled. The Data Manager began work in May 2002. Compilation and summarization of existing information for each park began in January 2001 and is ongoing.

It important to recognize that the progress the CAN Technical Committee has made to date is largely due to the contributions from park staff, which includes the Denali LTEM staff. Each member of the Technical Committee has contributed time to the Network by participating in meetings, assisting in data compilation and synthesis efforts, and in drafting and editing documents needed for the Scoping Workshop. The Denali LTEM staff have been particularly helpful in this vein because they have already been thinking about ecological monitoring and the issues associated with it. For example, in 1998 it was recognized that the inference scope for the DENA LTEM program was not park-wide. At that time, the staff began working on a program design that would allow the desired

inference scale. After two years of work, the probabilistic sampling design currently being used for vegetation and bird work is being implemented. These efforts have given the Network a "head start" in their thinking of how the monitoring program is approach for the whole network.

Appendix 1

Organization and Personnel of the Central Alaska Network

Board of Directors:

Dave Mills (Chair), *Superintendent, Yukon-Charley Rivers National Preserve*
Paul Anderson, *Superintendent, Denali National Park and Preserve*
Gary Candelaria, *Superintendent, Wrangell-St. Elias National Park and Preserve*

Technical Committee:

Maggie MacCluskie (Chair), *Coordinator, Central Alaska Network*

Wrangell-St. Elias National Park and Preserve:
- Devi Sharp, *Chief of Resources*
- Mason Reid, *Wildlife Biologist*
- Open position to be assigned

Denali National Park and Preserve:
- Susan Boudreau, *Chief of Resources*
- Guy Adema, *Physical Scientist*
- Carl Roland, *Botanist*

Yukon-Charley Rivers National Preserve
- Tom Liebscher, *Chief of Resources*
- John Burch, *Wildlife Biologist*
- Nikki Guldager, *Wildlife Biologist*

Sara Wesser, *Alaska Region Inventory and Monitoring Coordinator*
Kirk Lohman, *Alaska Region Science Advisor*
Nancy Deschu, *Alaska Region Hydrologist*
Karen Oakley, *Biologist, USGS - Alaska Science Center*

Work Groups:

Physical
Guy Adema - Lead
Susan Boudreau
Devi Sharp

Aquatic
Amy Larsen - Co-lead
Nancy Deschu - Co-lead
Kirk Lohman
Jim Finn - *Fisheries Biologist, Biological Resources Division, US Geological Survey*
Eric Veach, *Fisheries Biologist, Wrangell-St. Elias National Park and Preserve*

Flora
Carl Roland - Lead
Sara Wesser
Page Spencer - *Ecologist, Alaska Region, National Park Service*
Mary Beth Cook - *Botanist, Wrangell-St. Elias National Park Service*

Terrestrial Fauna
Nikki Guldager - Lead

John Burch
Mason Reid
Karen Oakley
Jim Lawler - *Wildlife Biologist, Yukon-Charley Rivers National Preserve*
Carol McIntyre - *Wildlife Biologist, Denali National Park and Preserve*