



**KLONDIKE GOLD RUSH
NATIONAL HISTORICAL PARK
Skagway, Alaska**

**NATURAL
RESOURCES
PROGRAM**

**SUMMARY
REPORT**

FY2009

October 2009

Dave Schirokauer
Natural Resources Program Manager
Klondike Gold Rush NHP

Overview and Summary:

The Natural Resources (NR) Branch at Klondike Gold Rush National Historical Park (KLGO) is committed to long term stewardship of natural and wilderness resources and values by maintaining the momentum on several ongoing projects as well as initiating several new projects during FY 2009. Partnerships with several outside agencies and NGOs have help keep these programs sustainable. The ongoing projects conducted in FY09 included: 1) Western Toad monitoring for breeding, survival, and occupancy; 2) Water-bird, and breeding-bird surveys; 3) Geographic Information Systems (GIS) support; 4) Exotic plant inventory, monitoring, and control; 5) Snow surveys in cooperation with USDA-NRCS at the Moore and West Creek sites; 6) Bear-human interaction training and monitoring; 7) Bat monitoring; 8) Bi-annual geohazard surveys in partnership with the municipality of Skagway and the Cold Regions Research and Engineering Lab; 9) Management of research permits; and 10) Natural resources training for seasonal interpreters and the interested public.

New Natural Resources projects included the following: 1) Field testing methods and protocol development for airborne contaminant monitoring at KLGO, Glacier Bay National Park (GLBA), & Sitka National Historical Park (SITK); 2) Completing a lichen inventory; and 3) Preparing equipment and compliance documents for a series of remote weather stations.

Many of the Natural Resources programs and projects would not be possible without close partnerships with the Southeast Alaska Network (SEAN) Inventory and Monitoring Programs. Funding, and inspiration from the SEAN I&M program has significantly expanded KLGO ability to collect natural resources data, provided support for a series of important inventories, and enhanced partnerships with other agencies and universities. The US Forests Service Research Station and the Tongass National Forest has been instrumental in supporting the air quality program which is just getting off the ground in KLGO and the other SEAN parks. The Municipality of Skagway (MOS) has been very supportive by encouraging several projects designed to study and protect NPS resources that occur outside the park boundary on municipal land. Specifically the funding provided for the geohazard survey, and the air quality monitoring have made significant expansions of these project possible. Also, the MOS's willingness to share in the cost of acquiring high resolution satellite imagery is encouraging.

While virtually all the natural resources activities fall under the Regional emphasis area "Demonstrate Stewardship of Natural, Cultural and Wilderness Resources and Values", when there is crossover of specific activities into other Regional emphasis areas, these projects may be listed under other Regional emphasis areas headings.



Wetlands in the region harbor a declining population of western toads.

Demonstrate Stewardship of Natural, Cultural and Wilderness Resources and Values

Airborne Contaminants Monitoring:



Deposition samplers near upper Dewey Lake

○ This year concluded the field work portion of a 3-year lichen and passive sampler based air quality study funded by WASO Air Resources Division and the SEAN Vital Signs program. The past two years of air quality field work represent the second decadal sampling cycle for lichen based air quality monitoring and the initial sampling period for passive chemical sensors for KLGO. This project's objectives and geographic extent were expanded by partnering with the Municipality of

Skagway, and the US Forest Service. Sampling sites were added on municipal land in Skagway and also included the other parks in the Southeast Alaska Network Inventory and Monitoring Program, GLBA, SITK. US Forest Service sites were added at Tracy Arm (USFS), and Juneau Forestry Science Lab. Draft Standard Operating Procedures were created. Data analysis and protocol documentation will occur over the winter. The field portion of the vital sign is scheduled to begin again in 2018.

This projects seeks to use 1) lichen as bio indicators through lichen community assessment plots; 2) lichen as bio integrators of contaminants by analyzing tissue for elemental composition including mercury, 3) passive ambient concentration and passive deposition samplers to asses and model chemical signals in lichen tissue and 4) monitor mercury deposition in GLBA as part of the Mercury Deposition Network (MDN).



Passive ambient concentrations sampling for various oxides of nitrogen and sulfur with Ogawa filters.

The implementation plan for the project is available at T:\NRM\Lichen\ARD Ecological Effects Project\AQD Project 2008\Implementation Plans\Airborne Contaminants Monitoring Implementation Plan - Southeast Alaska NPs.pdf

- Air chemistry monitoring is continuing to be funded by the Government of Canada, Indian and Northern Affairs. One passive air samples for Persistent Organic Pollutants (POPs) has been operating in Dyea since 2004. These data are being analyzed by Canadian labs. The Canadian Government also operates an active atmospheric mercury sensor at a site 30 mile north of Whitehorse. These data will become part of a regional analysis for mercury concentrations, depositions, and bio accumulation.

- Additional lichen community plots were installed in the Skagway area by a PhD student for the Oregon State University operating under US Forest Service funding. These along with previously established plots will be the foundation for a Southeast Alaska pollution gradient model of epiphytic lichen communities. We plan to expand the lichen community gradient modeling efforts to predict and reveal climate change driven impacts as well as pollution caused effects.
- An automated visibility camera (vis-cam) was operated from May to August from a site overlooking the Skagway harbor. Images are subjectively assessed for the relative amount of visible cruise ship haze /exhaust in each image. Twenty percent of the several hundred images from the 2008-09 seasons have been assessed. Protocols on setting-up and assessing the vis-cam images have been created, along with a database that contains ratings for each image. These are available in T:\NRM\Air Quality\VisCam.



Vis camera image of the Skagway harbor.

Western Toad Breeding and Occupancy Monitoring:



Western Toad in Dyea

- Three of the 7 core wetlands sites surveyed for western toads were positively identified as breeding sites in FY09. Although the breeding occupancy of core sites is the same as last year, the overall production was low this year because 2 of the 3 sites at which breeding occurred failed to produce metamorphs. Warm early season temperatures caused the wetlands to dry up in early June.
- The Cornell University researcher Iris Holmes collect tadpole in the park again this year for a phylogenetic study of western toads in the northern Lynn Canal Region of Southeast Alaska.
- Sampling for Chytrid fungus (*Batrachochytrium dendrobatidis*) in 2005 confirmed its presence in the Dyea area. Chytrid testing occurred again this season with 5 samples collected in Dyea and 79 samples collected by Parks Canada staff in Chilkoot Trail National Historical Site. Samples from both will be analyzed at Cornell University's Department of Ecology and Evolutionary Biology Genetic Lab.
- Draft protocols and SOP for amphibian monitoring were completed. The final report is available at T:\NRM\Amphibians\2009 Amphibian\2009 Amphibian Monitoring Report.docx

Lichen Inventory:

- Fieldwork on the lichen inventory was completed in fall of 2008. The contract lichenologist, Toby Spribille recently completed a draft manuscript on the project that has been accepted to *The Bryologist*. Preliminary results suggest that 19 undescribed species were detected along with 5 species new to North America. Twelve new species will be described as part of this study. The most remarkable finding is a new species of *Steinaria*, its nearest congeners are found on the Antarctic peninsula and Terra del Fuego.
- Funding (NRPP-Region Block) was obtained to create a checklist of Alaskan Lichens. The work is being conducted through the AK CESU at the University of Alaska, Fairbanks. KLGO's Natural Resources Program manager is the regional lead on this project.



An unknown species from the Lecanora polytropa group with white thallus – White Pass Unit

Geohazard Survey:



North Denver Icefall Lake is a moraine dammed proglacial lake that may harbor an ice core.

- In August of 2007, Dr. Dan Lawson of the Cold Regions Research Lab led a survey of proglacial lakes with the potential to harbor outburst hazard potential in the Skagway and Taiya River Watersheds.

This effort was repeated in September of 2009 sans Dr Lawson who could not make it. The Natural Resources Program Manager, the Municipality of Skagway's City Manager and the Safety Chair on the

Municipal Assembly conducted a complete survey of the Skagway River watershed on September 4 and the Taiya River Watershed on September 29. Conditions observed in 2009 were very similar to 2007. The existing proglacial lakes were seemingly unchanged, and no large new lake hazards were detected. A more detailed look at the photos acquired during these flights with Dr. Lawson's assistance will occur in FY10. Dr. Lawson and park staff will work on a proposal for more detailed analysis of suspect moraines. Future studies to determine the subsurface composition of the Boat Ramp Lake moraine may include terrestrial LiDAR, resistivity, and seismic sensors. Installing a remote lake level monitor was discussed as part of a potential early warning system for outburst flooding on the Nourse River. Survey flights should be conducted every two years. A report is available at T:\NRM\Geohazards\Skagway Geohazard Survey 2007.pdf

Weather Station:

- A Remote Automated Weather Station (RAWS) was set-up at tested at the parks maintenance facility in anticipation of deploying it at Chilkoot Pass. Lack of time to complete NEPA compliance delayed the deployment until FY10. This the SEAN networks first weather station to be tested,
- A draft EA for the Chilkoot weather station was completed. This EA will be expanded to included weather stations at Sheep Camp, Dyea, and possible Goat Lake.

Avian Monitoring:



Arctic Tern near Dyea

- KLG0 conducted Year 15 of the Alaska Landbird Monitoring Survey (ALMS) and continued the Skagway Breeding Bird Survey (BBS) with the on-going help of USFWS Biologist Deb Rudis.

- Water-bird surveys initiated in 2003 in the Taiya Inlet continued in 2009. Regional / National funding for avian influenza detection was used to enhance the frequency of these surveys.

- Coastal water-bird survey data was considered very useful during the oil spill response drill held in Skagway this season.
- Draft protocols and SOPs were completed for all the components of the bird survey program. The final report is available at T:\NRM\Birds\Reports\A Summary of Bird Surveys 2009.pdf

Geographic Information Systems:

- Major new cartographic products included: 1) Arial photo flight lines; 2) Bird survey routes; 3) Archeology survey areas and 4) New areas mapped for invasive plants.

Exotic Plant Management Monitoring and Control:

- Over 1000 hours were devoted to exotic plant management in FY09 and increase of 66% over FY08; approximately 660 Of those were spent manually removing exotics, with the majority of time spent at the Skagway airport removing Sweet white clover and in Dyea and at Nelson Slough restoration site.



EPMT staff working at Nelson Slough

- Within the park boundary 0.4 gross acres were treated and 0.6 acres were controlled – partially meeting the FY09 GPRA goal 1a1B for invasive plants species. Lack of a SAGA EPMT crew in FY09 led to missing the gross acres treated goal of 0.5 acres by 0.1 acres; however, the acres controlled goal of 0.6 acres was met. Over 2 acres of a highly disruptive aggressive exotic invasive, white sweet clover were controlled outside the park boundary (within the National Landmark) which did not apply to meeting the GPRA goals.
- The park and the community benefited greatly from the community weed pull; 32 folks participated, many motivated by the tee-shirts offer as a gift for volunteering.

Bear Management and Monitoring:

- The Natural Resources Program manager continued to work with the Municipality of Skagway, the Skagway Traditional Council, and the Skagway Police Department to acquire more bear resistant dumpsters for Skagway. The Skagway Traditional Council (with the assistance of the NPS) submitted a Tribal Wildlife Grant application to the US Fish and Wildlife Service for finding additional bear resistant garbage receptacles.



Jessica Wilbarger maintaining a wildlife trapping camera.

- A report describing the multi-year analysis of bear-human interactions on the Chilkoot trail was completed by Sandra McDougall of Red Deer College. KLGO collaborated with in this study by providing GIS analyses and inputting all the bear-human interaction data for both the Canadian and US side of the trail into the new AKR BHIMS database from 2001-2008. One interesting result showed high rates of bear-human interactions on the first portion of the Chilkoot trail between the trailhead and Finnegan’s Point. The report is available at T:\NRM\Mammals\Bears\CTNHS-KLGO 2001-2008 Analysis\MacDougall 2009 Chilkoot Bear People Interactions 02_08 final.pdf



A remote wildlife camera captures a bear on the Chilkoot Trail.

- Based on the needs associated with this analysis, additional new features for Alaska Regional BHMIS program were proposed by KLGO’s NR Program Manager.

- Based on recommendation in the multi-year analysis, KLGO natural resource staff set-up 3 Reconyx wildlife trapping cameras on the first few miles of the Chilkoot trail to look for a relationship between human and bear use of the trail.

Bat Inventory and Monitoring:

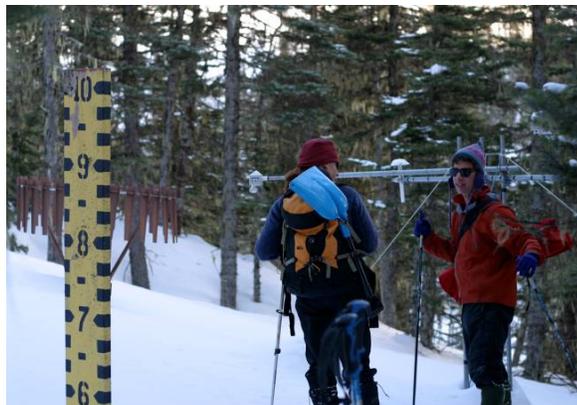
- The acoustic bat monitoring program initiated in 2007 was continued. A lot of bat activity was detected again in Dyea along with additional detections of the silver-haired bat. The detector will remain deployed until early November. A final report on the bat project is available: T:\NRM\Mammals\Bats\2009\2009 Bat Report Full.pdf.
- These surveys provide a look at bat activity using passive acoustic monitoring techniques that are commonly employed in species surveys. Detections can be attributed to at least one of four *Myotis* species (most likely the little brown bat *Myotis lucifugus*), as well as a non-*Myotis* species (most likely the silver-haired bat, *Lasiurus noctivagans*), newly recorded in 2008. Identification beyond the genus level was not possible with the resources available.
- The continuation of this study would benefit from the addition of mist-netting efforts and from active acoustic monitoring and a PMIS proposal for this work is in the parks 5-year plan. These techniques would provide the data to precisely define the resident species. FY09 is the last year we will monitor bats (with only acoustic means) until 2013.



Little brown bat on the Moore House.

Snow Survey:

- KLGO staff continued to run The USDA Natural Resources Conservation Service (NRCS) snow survey site on West Creek and near the Moore Creek Bridge along the South Klondike Highway.



Preparing to collect snow density measurements.

Soundscape Monitoring:

- A Spectra System acoustic monitor was deployed at the Moore House for 15 days in late May and early June and near the False Front in Dyea during June and July.
- Wrote an article for the fall 2009 issue of Park Science on attended audibility monitoring
- Obtained NRAC (Regional) funding to purchase 2 acoustic monitoring units for the Regional equipment cache.
- Updated the Palm attended audibility application (v8) to include sample logging.
- Worked with park historian on a description of the parks acoustic resources for a service-wide analysis and presented at the GWS meeting in March 2009.

Southeast Alaska Network (SEAN) Inventory and Monitoring Program:

- The NR Program staff completed draft Standard Operating Procedures (SOP) for various components of 1) air quality monitoring; 2) amphibian surveys; 3) bird monitoring; and 4) bat monitoring.

Social Science for Commercial Use Planning:

- A Cooperative Agreement between The University of Vermont and the NPS was signed to provide assistance in gathering and analyzing social science data from the park commercially guided visitors. A scoping meeting with Dr. Bob Manning was held in August. The on the ground work is scheduled the summer of 2010.

Mock Oil Spill Response:

- The park participated in a mock oil spill drill in July. The park provided GIS support using ShoreZone data and coastal water-bird inventory data. These was an impressive array of resources available for this response including State and Federal officials from Juneau and Anchorage.

Documentation of a wolf on the Chilkoot Trail:

- A wildlife trapping camera document the presence of wolf on April 29, 2009. Several people reported sighting wolves in Dyea. The camera traps were managed by the Natural Resource Program's YCC intern.



Geologic Mapping Scoping:

- We hosed a two day meeting to scope out geologic mapping for the park. The highlight was Dr. Dave Brew leading a field trip through the area. Geologic mapping will take about two years to complete and will be based on existing data for the region. No new field work is planned. A report on the scoping is available at T:\NRM\Geology\Draft KLGO_GRI_scoping_summary_2009-0904.doc

Natural Resources Volunteer Program:

- This year the Natural Resources Program used volunteers for a variety of duties. In total, 1,244 hours of work were donated to Klondike Gold Rush National Historical Park’s Natural Resources Program (Table 1). The dedication and fortitude of these volunteers enhanced the program’s capacity to protect and manage natural resources, as well as enhancing our ability to conduct inventory and monitoring activities. Volunteers’ helped Klondike Gold Rush National Historical Park’s program with:
 - 1) **Geographic Information Systems (GIS)** – Volunteers helped with map making, data collection, data management, and GPS support. Liz Rankin helped complete the aerial photo flight-line GIS database.
 - 2) **Invasive plant management** - Volunteer help came from the NPS and Taiya Inlet Watershed Council’s SAGA Crews, Sharon Lepich, the Boy Scouts and members of the Skagway community. These folks provided energetic labor over the course of several days to help control our highest priority invasive plant including white-sweet clover at the Skagway airport.
 - 3) **Western Toad Monitoring** – Riley Westfall provided valuable assistance monitoring for the presence and phenology of western toads in a set of ponds located in the West Creek drainage area.
 - 4) **Lichen Community Plots** – Heather Rood and Laura Nelson conducted several lichen community plots in Skagway to enhance our ability to use lichen communities to detect changes in air quality and climate.
 - 5) **Herbarium Database** – Nathan Pease initiated the creation of a user friendly herbarium database that links scanned images of the specimens to biological data in an MS Access environment. Work on this product will continue in FY10.

Table 1. Volunteer hours for KLGO Natural Resources in FY09

Name	Project	Hours
Jessica Wilbarger	SCA – Ecological Science Technician: invasive plants, weather stations, air quality and GIS	960
Riley Westfall	Western Toad and air quality	150
Heather Root	Lichen collections	36
Laura Nelson	Lichen collections	36
Sharon Lepich	Invasive plant control & lichen curation	78
Liz Rankin	Database and field assistant	132
Nathan Pease	Database and field assistant	120
Community weed pull	Invasive plant control	80
Boy Scouts of America	Invasive plant control	22
Sub-total		1,614

Expand Education Outreach and Public Understanding of Alaska Park Resources

- Created three Resources Briefs for distribution to the public on the KLGO website and at the visitor center. Topics include amphibian monitoring, climate change in northern Southeast Alaska, and air quality monitoring. These are available at T:\NRM\Resource Briefs
- Assisted the parks Education Specialist with designing and setting up biophysical monitoring plots in Dyea (municipal land) for the Skagway School science program.
- Presented a program on lichens to the Skagway summer camp students.
- Hosted a field trip to the parks herbarium for the Skagway School high school biology students.
- Assisted the parks Education Specialist with educating children at the Skagway Summer Camp on the impact of invasive species as part of the devoted to Dyea program.
- Created community awareness on problems associated invasive plant through the community week pull event and with a story on the local public radio station. We also created a brochure on Jewelweed, an emerging invasive plant in Skagway.
- Co-sponsored along with the Skagway Police and the AK Department of Fish and Game, a twice daily public service announcement on the local radio station about bear safety.
- Spoke on the local radio station about climate change and what it means locally.
- Provided a public presentation with the Tongass National Forest on lichens as Bio-indicators.
- Provided a public presentation titled Can Bears and Humans Coexist – public presentation
- Assisted the Skagway School as a Science fair judge

Program Management:

- Recruited, hired, supervised and evaluated 2 seasonal employees, 1 SCA, and one YCC intern
- Managed the Research Permit and Reporting System for the park
- Crafted several PMIS statements and completions reports
- Wrote JHAs for NR operations12) Supervisory and administrative support for the NR, NR volunteer program, and GIS program; and 12) Program management and compliance including grant writing, project proposals (PMIS), inputting projects into PEPC, and accomplishment tracking and reporting (PMDS-GPRA).
- Completed draft MOU with Skagway

Professional Presentations:

- Airborne contaminant monitoring at the George Wright Society meeting in Portland Oregon.
- Attended audibility for soundscape monitoring at the George Wright Society meeting in Portland Oregon.
- Climate change and the Upper Lynn Canal – in house presentation to interpretive staff.
- Geohazard in KLGO – NRAC & GIS First Tuesday presentations

Other projects, roles, and activities:

- Regional representative on the National Wildlife Habituation Steering Committee
- Regional NRAC representative on the FLREA 20% proposal evaluation team
- Attended WASO Soundscape Summit – presented future options for attended audibility monitoring
- Member Dyea Plan Core Team
- Member RSS Core Team
- Hosted Natural Resources Condition Assessment workshop
- Assisting Education Specialist with designing bio-physical monitoring plots for Skagway School program.
- NPS liaison to the Taiya Inlet Watershed Council
- Science fair judge

Natural Resources Program Staff, & Partners:

NPS Staff:

Dave Schirokauer, Natural Resources Program Manager, GS-0401-11: permanent, full-time, started 4/01/07. Primary duties: NR program manager, I&M program coordinator, NRAC representative, GIS coordinator, NEPA coordinator, Research Permit coordinator, IPM coordinator, and Ergonomic safety coordinator.

Heather Wetherbee, Biological Technician (Amphibians), GS-0404-07: seasonal from 3/11/09 to 9/23/09. Primary duties: coordinate amphibian inventory and monitoring, lichen database and curation, and assist in all NR program activities.

Dashiell Feierabend, Biological Technician, (Plants), GS-0404-05: seasonal from 3/31/09 to 8/24/09. Primary duties: conduct birds surveys, coordinate and conduct exotic plant surveys and control work, and assist in all NR program activities. Dash left early to attend graduate school.

Jessica Wilbarger, SCA Ecological Science Intern, 4/12/09 to 10/12/09. Primary duties: conduct birds surveys, coordinate and conduct exotic plant surveys and control work, and assist in all NR program activities.

Shelby Surdyk, Student Intern GS-2 and YCC Intern: Worked on lichen collecting, cleaning, and wildlife trapping camera project during the winter and NR field operation during summer.

Kari Rain, Visitor Use Assistant GS-5: Updated BHIMS database and collected and cleaned lichens for one pay period.

Linda Coldiron, Visitor Use Assistant GS-5: Assisted with creating the Resource Brief Series.

Theresa Thibault, Chief of Resources Management KLGO

Visiting Partner Scientists in FY 2009

Bear-human interaction study for the Chilkoot Trail:

Sandra MacDougall, Biologist Red Deer College, Alberta Canada

Jeni Rudicill, Warden, Parks Canada

Geologic mapping:

Dave Brew, PhD, USGS Research Geologist emeritus

Ric Wilson, PhD, USGS Research Geologist

Bruce Heise Geologist, NPS Geologic Resources Division

Tim Conners, Geologist GIS, NPS Geologic Resources Division

Ron Karpilo, Research associate, Colorado State University

Katie KellerLynn, Research associate, Colorado State University

Social science

Bob Manning, PhD, University of Vermont

William Valliere, Research Staff, University of Vermont

Air quality – lichens

Karen Dillman, Ecologist, Tongass National Forest

Rosa Perez, PhD, Visiting scientist from the University of Mexico

Heather Root, PhD Candidate, Oregon State University

Laura Nelson, Research Assistant

Natural resources condition assessment:

Barry Draskowski, PhD, Director, GeoSpatial Services, Saint Mary's University of Minnesota

Andy Robertson, Project Manager GeoSpatial Service, Saint Mary's University of Minnesota

Sara Wesser, Regional NPS I&M Coordinator

Greg Daniels, Regional NPS GIS Specialist

US Fish & Wildlife Services

Deb Rudis, Contaminant Biologist – Bird surveys

AK Fish & Game

Ryan Scott, Wildlife Biologist, bear-human interactions

AKRO EPMT:

Bobbie Simpson, Acting Alaska EPMT Coordinator

Airborne Contaminants:

Dr. Patrick Roach, Indian and Northern Affairs Canada

FY2009 Expenditures

ONPS Base: \$150,000

- Personnel
- Equipment, supplies, & travel

Small Parks NRPP: \$9,405

- Lichen and passive sensor based airborne contaminants study

Air Quality Ecological Effects: \$27,000

- Lichen and passive sensor based airborne contaminants study

SEAN I&M Program - Airborne Contaminants Vital Sign: \$39,500

- Lichen and passive sensor based airborne contaminants study
- KLGO weather station

AKR-WASO EPMT Program: \$6,300

- Funding for invasive plant SCA
- Funding to travel to Anchorage for EPMT training

ARK-PLC EPMT Program: \$6,200

- Funding for invasive plant SCA

AKRO Avian Influenza Project: \$3,000

- Partial funding for coastal water bird surveys

AKRO Regional Natural Resource Program: \$1,500

- Partial funding for the bear safety PSA on KHNS
- AKRO Grant (\$1,000): Travel to the George Write Society

Challenge Cost Share - Partnership with the Municipality of Skagway: \$10,700

- Geohazard Survey
- Air quality monitoring

Municipality of Skagway: \$13,000

- Funding for additional airborne contaminant monitoring sites
- Geohazard survey

NRPP Regional Program Block: \$14,493

- Annotated checklist of Alaskan Lichens
- Regional acoustic monitoring equipment cache

Regional Natural Resources: \$10,744

- Regional acoustic monitoring equipment cache

WASO Natural Sounds Program (\$4,200)

- Funding for programming services NPS Soundscape PDA Application
- Funding for travel to Soundscape Summit