Denali National Park and Preserve

1994 STATE OF PARK RESOURCES REPORT

RESOURCE CONDITIONS

Golden Eagle and Gyrfalcon Nesting Success

Nesting success and production of golden eagles and gyrfalcons in the northeastern portion of Denali were very low this year compared to the past seven years. Golden eagle nesting territory occupancy rates remained high (84%), however only 33% (18/54) of the territorial pairs laid eggs this year and only 15% (8/54) produced fledglings. Only 9 fledglings were produced on the study area. This was the lowest nesting success and productivity recorded for golden eagles during the eight year study period.

Gyrfalcon nesting territory occupancy rates remained high (90%), however nesting success and productivity were extremely low. There was a significant difference in gyrfalcon brood size this year compared to all other years, with all successful gyrfalcons producing only one fledgling each.

Changes in the abundance and/or availability of food supply for both golden eagles and gyrfalcons are suspected to be the major factors influencing nesting success and productivity. Quantitative methods of estimating broad population trends of snowshoe hare, willow ptarmigan, arctic ground squirrel, hoary marmot and other species used as food by golden eagles and gyrfalcons must be established on a park-wide basis to effectively assess the influence of food supply of golden eagle and gyrfalcon nesting success.

Results from our banding efforts continue to trickle in. Two eagles banded in Denali as nestlings were found dead during the past year. The first was a four year old eagle that was banded in 1989. It was found electrocuted near Boulder, Colorado. The second was a first year bird banded in 1993. It was found dead in April 1994 near Paradise, Kansas. The eagle had been shot through the chest with a high powered rifle.

Dall Sheep Lamp Production Increases

Ground-based and aerial trend counts for Dall sheep were conducted in 1994 during the week of 27 June. A total of 202 sheep were classified during the ground-based count. 120 ewes, 11 yearlings, and 67 lambs were counted, resulting in 56 lambs/100 ewes and one yearling/100 ewes. This year's lamb count was the highest since 1988 and is up considerably from the 1993 survey period when six lambs/100 ewes were observed. The 1994 yearling count is indicative of the poor 1993 lambing rate. Ground-based counts have been conducted along the park road corridor since 1974.

The third annual aerial sheep count was conducted over the Outer Range, Upper Savage, Upper Sanctuary, and Upper Teklanika areas. Results indicated a total of 480 sheep counted. Of this total, 292 were unclassified, "ewe-like" animals, 104 were lambs, and 84 were rams.

Merlins Soar Over Denali

The park employed the assistance of two volunteers through the spring and summer to continue the Merlin monitoring work conducted by Scott Wilbor from 1990 through 1993. The monitoring effort focused on territorial occupancy and reproductive performance of merlins found along major river drainages in northeastern Denali and in the Wonder Lake tundra region. With help from Carol McIntyre (NPS), Jeff Bouton (Alaska Bird Observatory) and park personnel, 35 potential territories were surveyed. At least 21 of these territories were determined to be occupied. Of the 21 occupied sites, at least 14 successfully fledged young.

In 1993, 15 territories were known to be occupied with at least 9 successfully fledging young.

The work accomplished this season will be valuable as Denali strives to institute a long term Merlin monitoring program in succeeding years.

Breeding Bird Surveys

Breeding bird surveys were conducted on two routes on the Denali Park road in 1994. The Toklat route which runs from the Toklat river bridge to approximately mile 79 was conducted on 22 May. Weather conditions were fair with 40 to 50 degree temperatures, partly to mostly cloudy skies and winds ranging from 4 to 12 mph. Two hundred fifty eight individuals of 27 species were detected. The Savage route which runs from the Savage river bridge to Sable Pass was conducted was 23 May. Weather conditions were good with temperatures in the 40's, partly cloudy skies, and no wind. A total of 226 individuals of 22 different species was detected. Results for both routes were consistent with counts reported previously.

Water Resources Conditions

Water samples have been collected from a variety of watersheds throughout Denali National Park and Preserve to assemble a baseline data set of stream physical and chemical conditions. More than 50 sites will be sampled by the end of the 1994 field season. Approximately 20 sites are being sampled repetitively to obtain results under varying flow regimes.

Field measurements include stream discharge, pH, electrical conductivity, dissolved oxygen, and temperature. In the laboratory, water samples are being analyzed for major cations (calcium, magnesium, sodium, and potassium), major anions (nitrate, chloride, and sulfate), ammonium, dissolved organic carbon, pH, electrical conductivity, alkalinity, suspended sediment and turbidity. Aquatic fungi present in each stream also are being isolated and identified. Data from 1994 will be analyzed and summarized this fall, with pertinent resulting publications to follow in 1995.

This study is being performed cooperatively through an interagency agreement between the National Park Service and the U.S. Forest Service. Co-investigators are Pamela J. Edwards, a Hydrologist with the U.S. Forest Service Northeastern Forest Experiment Station, Timber and Watershed Laboratory, and Michael J. Tranel, Environmental Specialist at Denali.

Snow Surveys

As part of the USDA Soil Conservation Service Cooperative Snow Survey Program, snow surveys were conducted at three snow courses in the Denali area during the winter of 1993-94. The surveys were done once a month at Lake Minchumina, Rock Creek Ridge and at the headquarters air quality station. In addition, hourly snow pillow (snow water content) data was collected on a Campbell 21X datalogger at the air quality station site throughout the winter, and five aerial snow markers on the south side of the range (Chelatna Lake, Nugget Bench, Dutch Hills, Ramsdyke Creek and Tokositna Valley) were flown twice. These markers were formerly flown by the SCS, but had been discontinued due to lack of funding.

All three of the snow courses were brushed and cleaned up during the summer. A new course and aerial snow marker were also established near the Kantishna airstrip, and an old, abandoned course near the Purkeypile airstrip was relocated and re-established. Both of these courses will be surveyed monthly this winter, in addition to the other three. We will also fly the five aerial snow markers on the south side again, but this time on a regular, monthly basis.

Geologic Mapping

In a cooperative effort between the USGS and NPS, geologic mapping of the USGS 1:250,000 Mt. McKinley quadrangle was initiated during a 10-day period in early August. Multiple teams of two and three persons investigated approximately 100 square miles, mapping the geology and taking samples for age dating and other analysis. The work concentrated in the bedrock exposures near the Herron, Foraker, and Peters Glaciers, with spot concentrations along the Denali Fault near those locations.

Several previously mapped lithologic boundaries were refined to reveal some new information. One previously described Pre-Cambrian Unit, formerly attributed to the Birch Creek Schist, was found to consist dominantly of a series steeply dipping altered marine sediments not normally found in the Birch

Creek Unit. A similar metasedimentary unit, found slightly further to the east, displays extensive faulting and folding which appear unassociated with the surrounding structures, or the "former" Birch Creek Schist. This unit may turn out to be a fault transported block (klippe) or an exposed older portion of local bedrock. Also identified in the area were several previously unmapped igneous intrusions of both granitic and medium volcanic origin. Limestones, presumed to be of Devonian age, were found on the North side of the Denali Fault, possibly suggesting a more restrictive movement history of the fault. Samples for fossil or radiometric age dating, (if successful) will greatly improve our understanding of all these rock units.

During June and early July, an eight person team of University of Alaska - Fairbanks climbers provided geologic mapping and rock sampling efforts on Mt. McKinley itself. The team documented a great deal of important geologic information (lithologies, contacts, textures, attitudes & structure, etc.), took photographs, mapped data, and obtained over 50 rock samples (probably weighing 30 - 40 pounds total) over 12,000 vertical feet of the mountain. This information is essential to attempt an accurate geologic mapping effort that, as far as we know, has never occurred at those elevations on Mt. McKinley.

Fossil Resources

A documented marine fossil site within Devonian limestones of the Upper Toklat River has previously yielded limited macro-invertebrates, restricted primarily to one species of brachiopod and conodonts. An investigation of the site, in July of 1994 with Dr. Robert Blodgett (USGS), has preliminarily revealed both solitary and colonial corals, six or seven species of brachiopods, and possible other marine fossil detritus. Lab analysis of samples will undoubtedly uncover additional fossil types.

Fossils were also collected from a previously documented Devonian limestone outcropping east of Cantwell Creek in June. Fossil fragments are visible only in relief on weathered surfaces; they apparently are not sufficiently silicified to show on broken surfaces.

A limestone outcropping west of the Teklanika River was visited in July. Echinoderm fragments of possibly Ordovician to Permian age have been collected there in the past, but, although the outcropping was searched fairly thoroughly during this visit, no fossils were found. Finally, two attempts to reach the Shellabarger Pass area (Ordovician through Devonian fossiliferous limestones) were aborted due to weather problems.

DENALI WOLF, CARIBOU, SHEEP CENSUS TRENDS 1984-1994

Species / Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
WOLVES Parkwide Estimate:											
Spring	NA	NA	93	52	76	102	128	130	126	107	100
Fall	NA	NA	81	83	143	169	173	169	150	140	NA
Denali Caribou Herd:											
Herd Population Estimate (June)	2200	NA	NA	2630	2850	3250	3740	2920	2810	1890	NA
Calves/100 Cows (September)	41	28	38	37	33	30	17	7	16	6	19
Bulls/100 Cows (September)	49	56	56	56	67	52	50	38	44	40	36
Dall Sheep: (no population estimate)											
Lambs/100 Ewes (July)	51	45	52	77	74	48	NA	28	24	6	56
Yearlings/100 Ewes (July)	16	15	15	26	20	26	NA	12	12	7	1
Snow Depth: (inches Previous winter)											
Park Headquarters	61	132	34	41	48	96	86	154	113	155	110

NA = Data not available

RESOURCE STEWARDSHIP ACTIVITIES

Stampede and Banjo Mills Investigations

In June 1994 the Resource Assessment Branch of the Minerals Management Division in the Regional Office initiated investigations of the Stampede Mine and Mill complex and the Banjo Mill tailings that lie on a patented claim purchased by the NPS in 1989. The investigations are being done cooperatively under a nationwide Memorandum of Understanding between the National Park Service and the Bureau of Mines. A site-specific Project Agreement dated May 26, 1994, summarizes the project objectives, procedures and reports.

The purpose of the project is to verify and document the presence of heavy metals in the mill tailings and surface water to determine the potential for or existence of releases. The project is also designed to provide a three dimensional image and associated database of the mill tailings at each site. This information can be used by the NPS in designing reclamation and waste remediation site plans, if needed.

Bureau of Mines staff from the Western Field Operations Center in Spokane, Washington visited the sites in June to gather early season water samples from the surface water, and from the adit on the Stampede property. Bureau staff also spent about ten days in mid-August mapping the sites, gathering water and soil samples, coring numerous holes in the tailings and documenting waste management concerns.

Draft reports on the site investigations, including water and tailing sample results, are expected from the Bureau of Mines by the end of February 1995, with final reports due on March 31, 1995.

Geographic Information Systems

In July, the Division of Research and Resource Preservation sponsored a workshop on Geographic Information Systems (GIS) in the park. Presentations were made by GIS staff from the Alaska Regional Office on a wide variety of topics. The workshop served as the formal kick-off for application of GIS technology here in the park. Significant progress was made in reviewing the current status of digital data sets, development of a framework for implementation of the technology in the park, and in demonstration of the capabilities of the ARCVIEW software.

Late in the summer, park staff placed orders for all necessary GIS hardware and software. We should be fully operational by January 1, 1995. We anticipate operating ARCINFO on a Sun workstation along with a half-a-dozen copies of ARCVIEW on desktop computers within the Division.

Drum and Battery Removal at Stampede Airstrip and Crooked Creek Mine

In August 1994 the Resource Assessment Branch of the Minerals Management Division in the Regional Office conducted the second year of an effort to remove and dispose of abandoned fuel drums, batteries and associated fuels and other contaminants at abandoned and donated mining properties in the Kantishna Hills. This year, the project focused on the Stampede airstrip (T13S, R14W, Secs. 30 & 31), Crooked Creek Mine (T13S, R15W, Secs. 8 & 9) and middle Caribou Creek (T15S, R17W, Sec. 17).

Regional Office staff working with park staff conducted drum retrieval using a leased Bell 206B Jet Ranger helicopter. Drums were placed into cargo nets and carried by the helicopter to a lined, bermed staging area at Toklat. A total of 233 55-gallon drums and 4 lead acid batteries were removed. An environmental contractor from Anchorage, Dames and Moore, conducted field hazard characterization, bulking and laboratory sampling for the NPS via a Corps of Engineers Interagency Agreement. NPS crews prepared empty drums for recycling.

Waste fluids removed for recycling or disposal

included: 135 gallons of fuels and oils, 381 gallons of contaminated water, 4 gallons of grease and 2 drums of petroleum contaminated solid waste. In addition, the empty 55 gallon drums were recycled at the Fairbanks landfill, along with the 4 lead acid batteries.

A final report detailing the project is being prepared by the Resource Assessment Branch and will be available by the end of 1994.

Bear-Human Interactions

There were a total of 204 documented bear-human interactions within the park in 1994, compared to 178 in 1993. Of this total, 61 occurred in the frontcountry and 143 occurred in the backcountry. 158 of the interactions were classified as encounters, which include any situation of close enough proximity between bears and humans that the bear clearly knows of a human presence, excluding serious charges, property damage, and physical contact. 15 of the interactions were determined to be incidents, which include situations when a bear makes physical contact with a human, property, or food without inflicting injury, when any serious-appearing charge comes within close proximity to a human, or when a bear deliberately approaches and investigates a campsite. 21 of the interactions fell within the property damage category. Three cases were reported of bears obtaining unnatural food, and seven cases were control actions. No human injuries were inflicted by bears.

Wildlife management staff began the 1994 season in March by providing much-needed patrols of park land to the south of the Alaska Range. Previous illegal snowmachine activity and wildlife violations on park lands precipitated the need for increased National Park Service presence. The patrols appeared to be a success and are expected to continue on 1995.

Healy Clean Coal Project

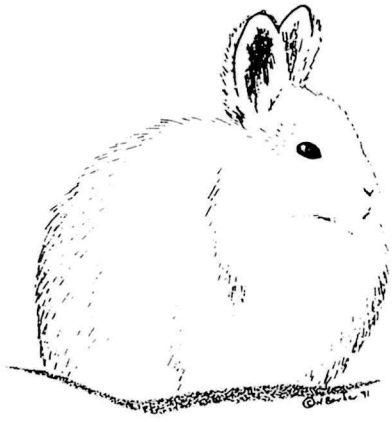
The National Park Service review of the Healy Clean Coal Project continued throughout the year. During the spring, Department of the Interior officials negotiated a mitigation agreement with Golden Valley Electric Association (GVEA). That agreement stipulates that certain technology be used in the plant and that monitoring programs be established with the National Park Service. Representatives from GVEA, the park, the National Park Service Air Quality Division, and the Environmental Protection Agency met to discuss details of air quality and visibility monitoring. The Air Quality Monitoring Plan was submitted to the state and is currently under public review.

Large Research Program Supported

The park continued to sponsor an extremely active research program. Denali National Park and Preserve has been designated as a Biosphere Reserve and therefore has an obligation to support a natural and social science program. In addition, the National Park Service supports research in an effort to identify solutions to resource related problems and to improve our understanding of park ecosystems.

National Biological Survey scientists continued investigations focused on grizzly bears, caribou, wolves, and revegetation while NPS staff continued work on golden eagles, merlins, mined land reclamation, and various geologic topics. Cooperating scientists studied wolves, moose, fungi, mosquitos, stoneflies, fisheries, glaciology, seismotology, sedimentology, and so forth.

Park staff also began development of a database on all known research projects ever undertaken at Denali. By years end, several hundred projects had been identified and preliminary information was posted in the database. Several years of research will be necessary to obtain full documentation on all of these studies and to complete the database.



ADMINISTRATIVE PROGRESS

Branch of Information Resources Established

A Branch of Information Resources, with responsibilities for geographic information system operations, data management, and technical support services, was established in the Division of Research and Resource Preservation this past summer. Concurrently the curatorial function was transferred from the Division of Interpretation to this new Branch. This move will greatly facilitate coordination of research activities with collections management. The Branch is currently staffed with one permanent employee (Jon Paynter) and one seasonal employee (Jennifer Wolk).

National Biological Survey Field Station Established

During 1993, the Secretary of the Interior announced the establishment of the National Biological Survey. This new bureau is intended to be a central clearinghouse for biological research conducted within the Department of the Interior and combines the forces of the National Park Service, the Fish and Wildlife Service, the Minerals Management Service, and other bureau scientists. All scientists within the National Park Service have been transferred to this new agency. Dr. Jeff Keay, the park's Research Wildlife Biologist, has moved over to the new agency but will remain stationed here at Denali. He will serve as the unit leader for the Denali Field Station that NBS will maintain. He will continue with his current investigations into the grizzly bear population of the park. It is anticipated that the park will enter into an agreement with NBS to govern the relationship between the two agencies.

Resources Management Planning

During the spring, park staff updated the resources management planning database and continued writing individual project statements. Those which are nearing completion include air quality, meteorology, geology, glaciology, research administration, Biosphere Reserve management, and several avian and large mammal statements. Numerous others are in draft form.

Research Permits Now Required

In an effort to provide more consistent support to park researchers and to improve communications between park staff and the scientific community, the park now requires that a Research Permit be issued to all scientists engaged in studies in the park. Permit processing allows park staff to review projects to assure that no adverse impacts to park resources are occurring and develops a binding relationship between the park and the investigator.

In addition, park staff is in the process of developing a computer database which will be used to track the status of all investigations which are ongoing. Use of this database will help assure compliance with requirements placed on scientists and will facilitate response to inquiries about current studies.

Financial Support

Funding to support research and resource preservation activities at Denali came from a variety of sources during 1994:

Resource Preservation	$759,798.00
Long-Term Monitoring	$ 92,650.00
	$852,448.00
Regional Research	$ 60,000.00
Other Sources	$201,375.00
	$261,375.00
Nat. Bio. Sur. Support	$551,750.00

For Further Information:

Division of Research and Resource Preservation
Denali National Park and Preserve
P.O. Box 9
Denali Park, AK 99755