

Alaska Cooperative Fish and Wildlife Research Unit

Annual Report—2006

March 2007

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University Staf	

Paleolimnology of Selected Lakes in the Southwest Alaska Network:
Understanding Past Trends of Salmon Abundance an

Graduate

- McKie Campbell—Commissioner, Alaska Department of Fish and Game
- Rowan Gould—Director, Region 7, US Fish and Wildlife Service
- Tom Melius—Di

Unit Cost-Benefit Statements

In-Kind Support

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ecoregions

Chinook salmon rearing habitat within a transboundary river floodplain in Southeast Alaska. Annual Meeting, Alaska Chapter, American Fisheries Society, Fairbanks, AK.

Smikrud, K. M., F. J. Margraf, A. Prakash, F. Huettmann, and B. Frenette. September 2006. A remote sensing/GIS based approach to predicting and estimating juvenile Chinook salmon rearing habitat in Southeast Alaska. Annual Meeting, American Fisheries Society, Lake Placid, NY.

Tanner, T. L. and F. J. Margraf. September 2006. Geomorphology and selection of spawning habitat by inconnu: A heuristic model. Annual Meeting, American Fisheries Society, Lake Placid, NY.

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Wick, H. M., P. L. Flint, C. L. Moran, and A. N. Powell. September 2006.

Lake, B. C., J. Walker, and M. S. Lindberg. 2006. Survival of du

Technical Publications of Federal Staff

- Morse, J. A. and A. N. Powell. 2006. Effects of recreational disturbance on breeding black oystercatchers in Kenai Fjords National Park. Final Report to the National Park Service. 38 pp.
- Taylor, A. R., A. N. Powell, and R. B. Lanctot. 2006. Behavior and physiology of post-breeding shorebirds on Alaska's North Slope. Annual Report to Coastal Marine Institute, University of Alaska Fairbanks, Fairbanks, AK.

Theses and Dissertations of Unit Graduate Students

- Mellon, C. D. 2006. The effects of intense fire on headwater streams of the Colville National Forest, WA. MS Thesis, University of Alaska Fairbanks. 65 pp.
- O'Brien, J. P. 2006. River features associated with chum salmon spawning areas: A method to estimate habitat capacity. MS Thesis, University of Alaska Fairbanks. 72 pp.
- Plumb, M. P. 2006. Ecological factors influencing fish distribution in a large subarctic lake system. MS Thesis, University of Alaska Fairbanks. 74 pp.

sensing. Principal components analysis (PCA) denoted an association between spawning sites and channel intersections, gravel bars, islands, and areas of

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habitat on any given year. Although moderately urbanized in its lower reaches, the

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addition provided n

fishes is great. Understanding the strength of the trophic connections be

The Role of Marine-Derived Nutrients in the Health and Sustainability of Resident and Anadromous Fishes of the Yukon River Drainage

Student Investigator: Chrissy Apodaca, PhD Biology

Advisor: Mark Wipfli

Funding Agency: Science Support Program/USGS

In-Kind Support: Logistical and equipment support provided by USFWS

Little is known about the presence and role of marine-derived nutrients (MDN) in the Yukon River watershed. MDN from adult salmon may influence the health and sustainability of fish that occur in and near salmon spawning areas. Yukon River salmon support important subsistence and commercial fisheries in both Alaska and Canada. Multi-species and ecosystem-level effects of marine subsidies remain poorly understood, particularly in large, complex river systems like the Yukon drainage. The objectives of this study are to determine: (1) the biological extent of MDN in riverine ecosystems (e.g., measu 0 41 1145 0 Tm 41 387 0828136 0 Tm () T76 0 Tm (m) Tj 41 0 0 4195j 4'

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future management. We used state-of-the-art methods and Program MARK to produce maximum likelihood estimates of nest, egg, and cygnet survival rates and assess the effects of weather, bear densities, cygnet age, and season date on survival. We will use Cormack-Jolly-Seber models, program MARK, and resightings and recaptures of marked birds to obtain seasonal estimates of age-specific adult survival probability, breeding probability, and neckband retention rates. Tundra swan productivity on the lower Alaska Peninsula was lower and more variable than elsewhere in Alaska, and high estimates of productivity on a portion of our study area with low bear densities suggest that depredation of nests by brown bears had considerable effects on variation in tundra swan reproductive success. Preliminary results indicate that population growth of the Izembek population may be limited by reproductive success, and therefore management to improve tundra swan reproductive success may positively influence population growth rates.

Aleutian Canada (Cackling) Geese: An Assessment of Abundance and Monitoring Designs

Student Investigator: Joshua Schmidt, PhD Biology

Advisor: Mark Lindberg

Funding Agency: USFWS (RWO 154)

Aleutian Canada geese were listed as an endangered species in 1967 and a recovery program began in 1974. Since that time the population has increased dramatically and an accurate measure of abundance was needed before considering management actions. The approach that was used for estimating the abundance of Aleutian geese in the past (Lincoln-Peterson) may not be accurate enough for sound management. There were also questions about the adequacy of the resighting effort and number of marked individuals that were monitored. The objectives of this study were to estimate the abundance of Aleutian Canada geese based on neck collar resighting data and provide guidelines for the number of geese to collar in the future and the amount of resighting effort that would be necessary to accurately estimate abundance. We used Jolly-Seber models in program MARK to estimate abundance.

Population Ecology of Pacific Common Eiders on the Yukon-Kuskokwim
Delta, Alaska

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varied across space and time during the aerial surveys. The largest numbers of shorebirds were found along the western Beaufort coast, and the peak of staging occurred between August 4-8. Thus, human activity and energy development in this area during late summer may affect a disproportionate number of staging shorebirds. Radio-marked shorebirds moved widely across the Nor

Migration Strategies and Winter Movements of King Eiders in the Bering Sea
Student Investigator: Steffen Opper, PhD Biology

phenology (including that of threatened species) is based on satellite telemetry data. If birds marked with satellite transmitters are not as successful in foraging as are untagged b

Field methods include distance sampling surveys in and around the new landfill and surveys along the 1970s transects. Data from the 1970s transects are collected with modern techniques but can be truncated to compare directly with 1970s methods. Preliminary results suggest the new landfill provides an important early-season feeding habitat for many birds. Nesting chronology seems to be advanced compared to nearby, undisturbed locations. Data from the 1970s transects are under analysis. As the Arctic continu

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landcover classes—were obtained at LCNPP, Koyukuk National Wildlife Refuge (KNWR), Alaska Peninsula/Becharof National Wildlife Refuge (APB), and Unit 20A. Additional habitat sampling and calf weight estimation will be completed in Unit 20A during spring 2007. For the study year 2005-2006, over-winter weight change of calves averaged -12.9 kg at KNWR (SE=2.1 kg, n=26), -2.0 kg at APNWR (SE=3.2 kg, n=10), and 8.1 kg at LCNPP (SE=2.2 kg, n=20) with statistically significant differences ($P \leq 0.0135$) among all areas. Analyses of forage characteristics from LCNPP, KNWR, APB, and 20A will be used to estimate habitat capacity and to

interpret calf weight change. Diff 020 Tm (s) Tj 41 0 0 41 2Tm (e) T38 0Tm (l) Tj 41 0 0 41 68d

Completed Ecological Studies

Carbon Dynamics of the US Forest Sector with/without Climate Change and Carbon Sequestration Management (RWO 144, completed), and Impact of Climate Change on Vegetation and Water Supply (RWO 150, ongoing)

Student Investigator: Mike Balshi, PhD Biology (partial support for graduate student programmer)

Faculty: A. David McGuire

Funding Agency: USDA Forest Service

These two studies have objectives that are linked. The overall objective of the first study is to compare the results of US forest sector carbon dynamics simulated by two different models, one of which is the model implemented in Dr. McGuire's lab (the Terrestrial Ecosystem Model) and the other of which is a model implemented by the USDA Forest Service (FORCARB). The second study will analyze t

Ecosystem Management and Regional Dynamics in Response to Global Change: Three Case Studies from the Tongass National Forest and Southeastern Alaska

Student Investigator: Colin Beier, PhD Biology

Advisor: A. David McGuire

Funding Agencies: National Science Forest, USDA Forest Service, USDA New Crops, and IARC

and suppression, though once fires escape initial attack, suppression is nearly impossible. We evaluated human fire ignitions and suppr

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the primary mechanism behind observed rates of drying in this study region. Greater surface area to volume ratios at dried lakes indicate that lakes with a shallow basin morphometry may be more susceptible to the effects of terrestrial

List of Abbreviations

ADFG	Alaska Department of Fish and Game
AKCFWRU	Alaska Cooperative Fish and Wildlife Research Unit
ARCUS	Arctic Research Consortium of the United States
BLM	Bureau of Land Management
CMI	Coastal Marine Institute, UAF
DBW	Department of Biology and Wildlife, UAF
DOE	Department of Energy
EVOS	Exxon-Valdez Oil Spill
GIS	Geographical Information System
GPS	Global Positioning System
IAB	Institute of Arctic Biology, UAF
IMS	Institute of Marine Science, UAF
MMS	Minerals Management Service
NASA	National Aeronautics and Space Administration
NPR-A	National Petroleum Reserve-Alaska
NPS	National Park Service