



Diver/Loon Specialist Group

Newsletter

Volume 2

Table of Contents

Introduction	1
Upcoming General Meetings.....	3
Featured Organization	3
Graduate Studies.....	3
Recent Publications	4
Abstracts of the NALF Conference	5
Loon /Diver Bibliography	9
The Status of Loons in Alaska - A Preliminary Needs Assessment	13
The Northeast Loon Study Workgroup: Cooperation in Action.....	15
Other News.....	15
Editor's Note	16

Introduction

Welcome to the Newsletter of the Diver/Loon Specialist Group of Wetlands International, now available on the web. Due to shortage of funds only a limited number of copies were printed and mailed to those not having access to the world wide web.

The main objective of the Diver/Loon Specialist Group of Wetlands International is to facilitate communication among loon researchers world wide and to develop a co-operative network of interested diver/loon researchers and managers. For this objective the first Newsletter was produced in 1977, along with a Members Directory to maintain a mailing list on a world wide basis. The Directory includes the name, address and research/management interest of members. Since that time many new colleagues not included in the original Directory sent their address. An updated Directory will be distributed later in the year.

The scientific workshops are the major media of communication among members of the D/L Specialist Group. The first such workshop was held during the North American Lake Management Society Annual Meeting, "Aquatic Ecosystem Stewardship" in Toronto, Ontario, Canada, November, 1995. A full day session, "Loons, Status, Management and Research" attracted participants from Canada, United States and Sweden. The abstracts of that session were published in the Journal of Lake and Reservoir Management (1995). and reprinted in the first Diver/Loon Specialist Group Newsletter.

A session, "Common Loons", was held during the annual meeting of the Society of Canadian Ornithologists, Fredericton, New Brunswick, Canada, August, 1996. The abstracts of the session were published in the society's newsletter *Picoides*, vol. 9 in the same year.

A symposium, "Loons: Old History and New Findings" was held during the American Ornithologists' Union Meeting, in Minneapolis, Minnesota, USA, August, 1997. The abstracts of the papers presented were included in this Newsletter. The Proceedings of this symposium will be published by the North American Loon Fund (<http://facstaff.uww.edu/wentzl/nalf/analfhomepage.html>). Our Specialist Group maintains close contact with the Scientific Committee of the North American Loon Fund, a nonprofit conservation organization, dedicated to the preservation of the loon in North America.

The Diver/Loon Specialist group provides input to improve the Wetlands International world loon population estimates since 1993. For more information concerning Wetlands International, see: <http://www.wetlands.agro.nl>.

Joseph Kerekes

Coordinator,

Diver/Loon Specialist Group, Wetlands International

Upcoming General Meetings

Third Conference, SIL Aquatic Birds Working Group

Limnology and Water Birds 2000, Societas Internationalis Limnologiae (SIL), Trebon, Czech Republic, 1 - 5 May 2000. First Announcement and call for papers are available on the web page:

<http://www.lf.czu.cz/trebon2000>.

For further information contact: Dr. Petr Musil, Institute of Applied Ecology, Kostelec nad Černými lesy, CZ-281-63, Czech Republic. Fax 420(203)697 500, e-mail: p.musil@post.cz or Dr. Joseph Kerekes, Canadian Wildlife Service, 45 Alderney Drive Dartmouth, N.S., B2Y 2N6, Canada, Phone: (902) 426-6356, Fax: (902) 426-4457; e-mail: joe.kerekes@ec.gc.ca

Featured Organization

BioDiversity Research Institute

BRI is a small nonprofit research group based in Freeport, Maine, USA. BRI is currently studying Loons and other piscivorous birds nationwide as bioindicators for aquatic ecotoxicity, specifically mercury contamination. This study, with a long-term scope, has already established that a geographic cline of mercury contamination exists West-to-East in the northern U.S., and Canada, with New England suffering from the highest environmental mercury levels. Continuing research is intended to quantify toxic effects of mercury on individuals and populations by relating exposure with behavioral patterns of loons and other piscivores in high risk areas in Minnesota, Wisconsin, Michigan, New Hampshire, Vermont, and Maine. BRI works in collaboration with federal, state, and private agencies, such as US Fish and Wildlife Service, USEPA, Canadian Wildlife Service, Maine DEP, Maine Audubon Society, and Loon Preservation Committee, as well as industry partners including Central Maine Power Company, and Florida Power and Electric. BRI is a member of the Northeast Loon Study Workgroup and an Alaska Loon/Grebe Working Group.

This summer, BRI will be joined by volunteers from EarthWatch Institute and Patagonia who will assist in behavioral observations. They will also be starting an informational web site, and an "Adopt A Loon" program to stimulate public awareness and involvement in Loon preservation.

New Reports Available!! Contact BioDiversity Research Institute at 195 Main St., Freeport, Maine 04032 or call/e-mail at 207-865-3302, bdloon@aol.com

1998. A comparison of mercury exposure and risk between artificial impoundments and natural lakes measured in Common Loons and their prey, 1996-97. Submitted to the Central Maine Power Company, Augusta, Maine.

1998. Determining mercury exposure in Maine's fish-eating birds. Submitted to the Maine Department of Environmental Protection, Augusta, Maine.

Graduate Studies

The behavioral toxicology of common loons (*Gavia immer*) in the Canadian Maritimes

Abstract from a thesis in preparation to partially fulfill the requirement for the degree of Master of Science (Biology) at Acadia University. Joseph J. Nocera, Atlantic Coop. Wildl. Ecol. Research Network (ACWERN), Biology Department, Acadia University, Wolfville, Nova Scotia, Canada, B0P 1X0

Common Loons (*Gavia immer*) in Kejimikujik National Park (Nova Scotia, Canada) have the highest blood mercury (Hg) levels of any population tested in North America. Also, loon reproductive success at this site is low compared with other North American populations. Mercury is a neurotoxin known to affect avian

behavior and cause aberrant breeding responses that may result in reduced productivity, lack of a nesting attempt, lower nest attentiveness or lower nest site fidelity. However, no previous studies have assessed the effects of Hg contamination on all aspects of the in situ behavior of loon populations nor described the behavior of non-breeding and post-nest failure loons during the summer breeding season. I conducted a comparative investigation of loon behavior across a range of lakes in Kejimikujik National Park and the Lepreau watershed (southwestern New Brunswick, Canada) that exhibited variation in lake morphometry, physical characteristics and lake chemistry, including mercury exposure. I have discovered the first association of blood Hg contamination to changes in the in situ breeding behavior of Common Loons. Time-activity budgets and the energetic balance of young are disrupted as blood Hg rises by reductions in time spent back-riding and increases in preening. These results confirm the hypothesis that loons could be at risk from exposure to elevated levels of bioavailable Hg by compromising the behavioral patterns of developing chicks. Both non-breeding and breeding adults showed no interaction between Hg and behavior which indicates that they are not as sensitive an indicator of environmental contamination as chicks.

For more information: <http://dragon.acadiau.ca/~acwern/jnocera/jnocera.htm>

Recent Publications

New COSEWIC Status Reports

Status reports on the Yellow-billed Loon *Gavia adamsii* and Common Loon *Gavia immer* have been prepared for COSEWIC, the Committee on the Status of Endangered Wildlife in Canada. These reports synthesize information on the birds' population size and trend, habitat requirements, and conservation threats in order to evaluate whether the species is at risk of endangerment in Canada. Neither species was designated at risk by COSEWIC. The Yellow-billed Loon was considered to be uncommon but widespread and not showing declines or threats over widespread areas. The report on the Common Loon concluded that the species is still sufficiently widespread and numerous in Canada despite threats from human development and recreational use of lakes, acid precipitation, and other pollutants. These two status reports are available from:

COSEWIC/RENEW Secretariat
c/o Canadian Wildlife Service
Environment Canada
Ottawa, Ontario K1A 0H3

Additional Recent Publications

Barr, J. F. 1996. Aspects of Common Loon (*Gavia immer*) feeding biology on its breeding ground. *Hydrobiol.* 321: 119-144.

Benjamin, N. and J. Kerekes. 1997. Grouping dynamics of Common Loons on Grafton Lake, Kejimikujik National Park, Nova Scotia, Canada (27 July-1 October, 1993). pp.91-102. In: Faragó and Kerekes (eds.). *Proc. Limnology and Waterfowl, Monitoring, Modelling and Management. Workshop, Sarród/Sopron, Hungary, 21-23 November, 1994 Wetlands Internat. Spec. Publ. 43.* 362p.

Clay, D. and H. Clay. 1997. Reproductive success of the common loon, *Gavia immer*, on a small oligotrophic lake in eastern Canada. *Can. Field-Nat.* 111:586-590.

Clay, H. and D. Clay 1997. Winter distribution of the Common Loon (*Gavia immer*) and Red-throated Loon (*Gavia stellata*) in the Bay of Fundy. *Nova Scotia Instit. Sci. Proceed.* 41(3):93-102.

Evers, D.C., J.D. Kaplan, M.W. Meyer, P.S. Reaman, W.E. Braselton, A. Major, N. Burgess, and A.M. Scheuhammer, 1998. Geographic trend in mercury measured in common loon feathers and blood. *Environ. Toxicol. Chem.* 17:173-183.

Kerekes, J. J. 1998. Problems associated with prediction of aquatic bird biomass from total phosphorus concentration. *Verh. Internat. Verein. Limnol. Vol. 26:* 2343-2646.

Kerekes, J., M. Duggan, D. Bates, R. Tordon and G., Boros 1997. Abundance and distribution of fish eating birds in Kejimikujik National Park, Nova Scotia, Canada. pp.81-90. In: Faragó and Kerekes (eds.). Proc. Limnology and Waterfowl, Monitoring, Modelling and Management. Workshop, Sarród/Sopron, Hungary, 21-23 November, 1994 Wetlands Internat. Publ. 43. 362p.

Meyer, M.W., D.C. Evers, J.J. Hartigan, and P.S. Rasmussen. 1998. Patterns of common loon (*Gavia immer*) mercury exposure, reproduction and survival in Wisconsin, USA. Environ. Toxicol. Chem. 17:184-190.

Momose, Junko. 1997. Wintering loons and Japanese fishermen. Report. 16p.

Available from: Ms. Junko Momose, 3 - 13 - 4 Sekiguchi, Bunkyo - ku, Tokyo, JAPAN, e-mail: jmomose@t3.rim.or.jp

Scheuhammer, A. M., C. M. Atchison, A. H. K. Wong, and D. C. Evers. 1998. Mercury exposure in breeding common loons (*Gavia immer*) in central Ontario, Canada. Environ. Toxicol. Chem. 17:191-196.

Scheuhammer, A.M. D. K. McNicol, M. L. Mallory and J. J. Kerekes. 1997. Mercury and selenium accumulation in common loons (*Gavia immer*) and common mergansers (*Mergus merganser*) from eastern Canada. Environ. Toxicol. Chem. 17:197-201.

Wolfe, M.F., S. Schwarzbach, and RA. Sulaiman. 1998. Effects of mercury on wildlife: a comprehensive review. Environ. Toxicol. Chem. 17:146-160.

Abstracts of the NALF Conference

Abstracts of papers presented in a symposium at the One Hundred and Fifteenth Stated Meeting of the American Ornithologists' Union

Loons: Old History and New Findings

13-16 August 1997, University of Minnesota, Minneapolis-Saint Paul, Minnesota

Conveners: Judith McIntyre and David C. Evers

Sponsor: North American Loon Fund

Introduction and overview of loons (Gaviidae). JUDITH W. McINTYRE, Utica Coll. of Syracuse Univ., Utica, NY.

Loons have long been identified as the most primitive birds, given to elaborate mating ceremonies, and related to all manner of other diving birds, including Hesperornis. Once published-oft repeated, is an accurate commentary on loon myths that have continued virtually unopposed until recently. Within the past 3 decades, the numbers of researchers and diversity of their studies have more accurately delineated loon biology, behavior, phylogenetic relationships, population status and conservation. This introduction will provide an overview of the past history of loon accounts, and note the changes in our understanding that burgeoning research and improved technology has provided, including commentary on individual identification, taxonomic methodology, experimental behavioral studies and toxicological analyses.

Why do loons have fewer parasites than grebes? ROBERT W. STORER, Mus. Zool., Univ. Michigan, Ann Arbor, MI.

Loons are known to be infected with 22 species of degenic trematodes and 18 of cestodes, whereas the figures for grebes are 108 and 86, respectively. Possible reasons for this difference and comparable ones in other groups of parasites include the number and diversity of the species in the two avian families, their geographic ranges, ecological preferences, size and morphology, foraging methods, and diet. It is probably that a combination of at least some of these factors has been responsible for the differences in the parasite faunas.

Causes of Common Loon mortality in Minnesota, 1992-1996. JIMMY PICHNER, Minnesota Zool. Garden, Apple Valley, MN.

A total of 40 loon carcasses and 37 injured loons were examined between 1992 and 1996. Necropsies were performed on all birds. Feather, kidney, liver and brain tissue were analyzed for heavy metals. Preliminary results indicate that mercury may be a major factor contributing to loon deaths in Minnesota.

What's killing New England Loons? ROSE MICONI, MARK POKRAS, INGA SIDOR, CHRISTOPHER JORDAN, Tufts Univ., Sch. Vet. Med., North Grafton, MA; and ANDREW MAJOR, US Fish. & Wildl. Ser., Concord, NH.

From 1989-1996, 317 Common Loons found dead or moribund throughout New England were examined as part of a mortality study. We will discuss the large percentage of loon mortality that is due directly or indirectly to human activities. These include trauma from gunshot and boat impact, lead poisoning from ingested fishing gear, and plastic entanglement. We will also discuss mortality from natural causes including fungal respiratory infections (aspergillosis), intraspecific aggression, and parasites. Toxicologic data will show that organic contaminants and metals are elevated in New England loons. Mercury levels detected in blood, liver tissue, and feathers are elevated and increase with age. Possible links between contaminants, disease and pathology will be discussed.

Patterns of Common Loon mercury exposure, reproduction, and survival in Wisconsin. MICHAEL W. MEYER, Wisconsin Dept. Nat. Res., Rhineland, WI; DAVID C. EVERS, BioDiversity Research Institute, Yarmouth, ME; JERRY J. HARTIGAN, Univ. Wisconsin-Stevens Point, WI; and PAUL W. RASMUSSEN, Wisconsin Dept. Nat. Res., Monona, WI.

A long-term study was initiated in 1992 to investigate whether elevated mercury (Hg) exposure measured in Wisconsin common loons was associated with reduced reproduction or survival. Common loon adults (n = 99) and chicks (n = 56) were captured on 47 study lakes 1992-93, each individually color-marked with plastic leg bands, and blood and feathers collected for Hg analysis. Annual adult return rates and reproductive outcome were then recorded for the study lakes 1993-1996. There was a significant linear relationship between lake pH and adult and chick blood Hg. Some egg Hg concentrations were within the range associated with reduced hatching success or reduced survival of embryos/hatchlings in sensitive avian species. Chick production was reduced at lakes where chick blood Hg concentrations were elevated. However, there was no relationship between levels of adult Hg exposure and reproductive performance or annual return rates. Establishing a cause-effect relationship between Hg exposure and loon fitness is confounded by the negative correlation between lake pH and Hg exposure.

Local variation in foraging strategies employed by wintering Common Loons. LUCY S. VLIETSTRA, SUNY Coll. Environ. Sci. & Forestry, Syracuse, NY.

Foraging strategies involve costs and benefits that uniquely affect an organism's time budget. Time budgets ultimately affect energetic returns and are influenced by factors such as individual traits of the forager (e.g. age, social status, physiological condition, risk of predation), local resource distribution, or both. I studied behavior in a wintering population of Common Loons in Florida exhibiting both solitary and group foraging. I tested the hypothesis that solitary and group foragers budget time differently and examined factors potentially influencing foraging decisions in this coastal piscivorous species. I observed solitary loons (n = 1933) and groups ranging from 2-200 individuals (n = 89). Solitary loons and groups of 2-14 loons did not associate with other species. Groups larger than 14 were always observed with aerial or other diving waterbirds and dolphins and only occurred during Jan and the first 2 wk of Feb. Loon-only groups spent less time foraging (37%) and more time drifting (44%) and preening (17%) than both solitary loons (63%, 17%, 8%, foraging, drifting, preening, respectively) and those in multispecies groups (82%, 12%, and 0%). Loons in multispecies groups foraged slightly but not significantly more than solitary loons. However, multispecies groups comprised a tightly packed "nucleus" of foraging loons that closely associated with other foraging species. Non-foraging loons drifted behind, and eventually away from the "nucleus", probably as the patch depleted. Multispecies groups also traveled farther (49 m/min) and dispersed sooner than other loons (18 m/min and 22 m/min, solitary and loon-only groups respectively).

Age- and molt-related differences in finding ability and energetic requirements, predation pressure, and differences in prey distribution due to salinity/turbidity gradients at this site, are discussed as potential factors affecting foraging decisions in wintering Common Loons.

Individuality in yodel calls recorded from a banded population of Common Loons. CHARLES WALCOTT*, *Sec. Neurobiol. & Behav., Cornell Univ., Ithaca, NY;* and DAVID EVERS, *BioDiversity Res. Inst., Freeport, ME.*

The Yodel call of the male loon is reported to be individually distinctive. This has led to the suggestion that male loons might be "vocal tagged", that is that they could be recognized by their yodels. Over a 6 year period, we have recorded and analyzed yodels from 8 banded loons at the Seney NWR and at Isle Royale. Factor analysis showed that there were year to year differences in each loon's yodel, but that these individual differences were smaller than the differences between different loons. On one occasion a territorial loon was displaced by another male loon. Chased off its old territory, the loon's yodel changed. How common this might be? We don't know. But if loons that change territories also change their yodels, vocal tagging is unlikely to be very useful.

Good news and bad news for Common Loon enthusiasts: Genetic monogamy but a high divorce rate. WALTER H. PIPER*, *Dept. Biol., George Mason Univ., Fairfax, VA;* DAVID EVERS, *Dept. Fisheries & Wildl., Univ. Minnesota., St. Paul, MN;* MICHAEL W. MEYER, *Dept. Nat. Res., Rhineland, WI;* KEREN TISCHLER, *Chilton, WI;* and MARGARET KLICH, *Guelph, ON.*

The study of Common Loon behavior and ecology has been revolutionized by recent refinement of the technique used to capture adults, which permits us to mark them and take tissue samples in a cost-effective manner. Repeated censuses, behavioral study and genetic analysis of parentage in a Wisconsin population that was marked in the wake of this advance have shed light on the mating system and degree of mate-fidelity in loons. DNA fingerprinting of 57 chicks in 40 different territories indicates that all young reared by a breeding pair are their true genetic offspring and not the result of matings between the breeding female and outside males (as occurs in most songbirds). A tendency for pair members to remain close together during the female's fertile period appears to preclude extra-pair copulation by the female. However, the popular myth that loons mate for life is not upheld by scientific data. Census results indicate that typical males and females attempt reproduction with 3 or more different mates during their lifetimes. The high rate of mate-switching occurs principally because of territorial takeover and desertion.

Incubating roles and patterns in Common Loons. JAMES D. PARUK, *Dept. Biol., Idaho State Univ., Pocatello, ID.*

Few studies have addressed sex roles of Common Loons during incubation. Twelve pairs of color-marked Common Loons were observed continuously from ½ hr before sunrise to ½ hr after sunset from 15 May-30 Aug 1993-1996, at Seney National Wildlife Refuge, Michigan, and Turtle Flambeau Flowage, Wisconsin. A total of 4774 hr of behavior were recorded; 1660 hr during nesting. The 27-29 day incubation period was divided into trimesters. Each trimester was sampled 3 days so that each pair was observed for a total of 9 days. Males and females spent equal time incubating. Length of incubation period increased during the nesting cycle. The average incubation period for males and females for the first trimester was 150 and 149 min, respectively. There was no difference in length of incubation time between the sexes during the second and third trimesters (male = 274 min, female = 258 min). During an incubation period, an adult may leave the nest to cool-off or interact with its mate. 28% (N = 102) of the loons left the nest at least once during their incubation period. More than half of these (N = 64, 63%) occurred during the first trimester suggesting that hormones initiating incubation behavior had not yet peaked. A total of 363 nest exchanges were observed. Nest exchanges were spread across every hour throughout the day, but significantly more occurred within 1 hr of local sunrise. There was a trend for females to incubate during the night, but in most cases, the last bird on the nest before dark remained there until the following morning. Most pairs averaged 4 nest exchanges/day, but more nest exchanges were common early in the nesting cycle, and fewer exchanges occurred toward the end of the incubation period. Pressures that may cause a loon to leave the nest during incubation may not have been uniform for all pairs. It appears that variability among pairs may be attributed to ecological or climatic factors, such as prey availability, single vs. multiple lake

territories, and high daytime temperatures. For example, both sexes from One Man lake territory incubated significantly longer than loons on other territories because it had a greatly reduced food base and the loon had to forage elsewhere. Similarly, hot weather (< 32.2 C) significantly increased the number of times an adult left the nest during an incubation period.

Influence of brood size and chick age toward parental care in Common Loons. JAY MAGER, Dept. Zool., Miami Univ., Oxford, OH.

By gathering time-activity budget data from a northern Michigan population of Common Loons, I attempted to determine the extent of parental demands with respect to chick age and brood size. Results suggest that the demands to protect young decrease with chick age, and these demands additionally do not appear to be influenced by brood size. Data also indicate that parents meet greater demands to feed offspring, in respect to both increased brood size and chick age, by increasing the size of food fed to offspring. These results illustrate the fact that different parental demands vary, both in terms of time and energy invested, with chick age. These results are also consistent with hypotheses concerning how depreciable and nondepreciable forms of parental effort should vary with brood size.

Comparison of Common Loon populations, based on long term monitoring, in Kejimikujik National Park, Nova Scotia and La Mauricie National Park, Quebec. DENNIS MASSE, La Mauricie Nat. Park, PQ; and JOSEPH KERKES, Can. Wildl. Ser., Dartmouth, NS.*

The results of monitoring of breeding populations of Common Loon populations in 25 oligotrophic lakes in Kejimikujik National Park (KNP), (381 km², 1982 - 1984, 1988 - 1995) and 76 lakes in La Mauricie National Park (LMNP), (544 km², 1987 - 1996) are compared. The number of residential pairs remained stable (39) in KNP in 1988 - 1995, while it increased from 20.2 to 27 (mean: 24.6) in LMNP. In KNP in 1982 - 1984 not as many lakes were covered but more young were seen. The reproductive success (number of young survived to six weeks of age) declined in both areas during the study, with a mean number of fledged young 15 (range 17-14 in 1982 - 1984) 11.1 (range 18-5 in 1988 - 1995) in KNP and 13.8 (range 20-6) in LMNP. Larger lakes (> 40 ha) were the preferred breeding habitat in both study areas but occasionally small lakes (7-10 ha) are used for breeding in LMNP. Changing water levels during the nesting period caused some of the low breeding successes in certain years in both areas. In LMNP the breeding success was lower in five lakes that were more utilized by the public (> 15 persons/ha/year). Four of these are heavily utilized (> 45 pers./ha/year) and were abandoned by breeding loons. Public use is the suspected cause of low or lack of breeding success at least in five lakes in KNP. A possible negative effect of increased traffic by researchers on loon reproduction is unknown. The number of adult loons is more than twice as high in KNP, yet the number of chicks are about the same when the two parks are normalized to that of the same surface area. The relative closeness to the seacoast (40 - 60 km in two directions) in KNP seems to ensure that even marginal territories are filled, presumably with young adults when became vacant. It has been shown elsewhere that marked young loons return to lakes when three years old, but do not breed until five years of age. Besides loons, Common Mergansers also breed in lakes (>40 ha) in KNP. The possible effects of competition between the two species is not known. The very low reproductive success in KNP and the possible source(s) of the high levels of mercury found in loons are the subject of intensive investigations. Management measures in LMNP include the use of artificial nesting islands, control of public access on certain lakes and a public education program.

Using implanted satellite transmitters to identify Common Loon migration routes, staging areas, and wintering range: An update. KEVIN P. KENOW, Upper Mississippi Sci. Center, La Crosse, WI; MICHAEL W. MEYER, Wisconsin Dept. Nat. Res., Rhinelander, WI; DAVID C. EVERS, PETER S. REAMAN, BioDiversity, Res. Inst., Freeport, ME; and JEFF HINES, Minnesota Dept. Nat. Res.*

Most of the U.S. Common Loon population nests on lakes in Wisconsin, Minnesota, and Michigan where state resource management agencies have developed research and habitat protection programs. Research in these states has focused on monitoring loon population trends and investigating breeding ground limiting factors. Additional life history information concerning seasonal patterns of movement and habitat selection are needed to develop regional and national Common Loon conservation strategies. This includes

identification of important migration routes, staging areas, and location and assessment of habitat requirements on the wintering grounds. Recent advances in transmitter attachment techniques have allowed biologists to successfully monitor waterfowl migrations using new technology that employs miniaturized satellite transmitters configured for intra-abdominal and subcutaneous implants. The application of this technique in the Common Loon is currently under evaluation by biologists with the USGS-BRD Upper Mississippi Science Center; Wisconsin, Minnesota, and Michigan Departments of Natural Resource, BioDiversity Research Institute. Here we report on the status of the project to date and summarize our observations of the behavioral and physiological effects of the technique on individuals that were radio-marked during 1996-97.

Population dynamics of color-marked Common Loons breeding in the Upper Great Lakes. DAVID C. EVERS, Univ. Minn., St. Paul, MN, and BioDiversity Res. Inst., Freeport, ME; JOSEPH D. KAPLAN, PETER S. REAMAN and JAMES D. PARUK, BioDiversity Res. Inst.

From 1989-96 we captured adult (n = 485) and juvenile (n = 393) Common Loons in 8 disjunct areas throughout the Upper Great Lakes Region. Individuals were weighed, sexed, and uniquely marked with colored leg bands for future identification. Mean body weight was 20% greater in males than females. Color-marked males and females returned to their previous year's territory at a similar rate of approximately 80 ± 7.5% (n = 669 returns out of 816 possibilities). Of the remaining adult loons an estimated 13% established or occupied a nearby territory, 3-4% occupied marginal habitats, and 3-4% were unaccounted. Annual adult loon mortality is estimated at less than 4%. A mate was exchanged in approximately 19% of the territorial breeding pairs. This mate switching is more frequent soon after ice-off and immediately after nest failures and is related to the frequency of intrusion rates. Recruitment rates are still unknown. The earliest returning adult banded as a juvenile (ABJ) was 3 yr. First-year breeding ranged from 5-10 yr. Returning ABJs typically occupy marginal habitats until acquiring a higher quality habitat. Adult and juvenile loons probably have a direct north-south autumn and spring migration route to their wintering areas. Nearly all recoveries of adult (n = 5) and juvenile (n = 15) loons from Nov-Mar are from the Florida and Alabama coasts.

Presented in the Poster Session

The relationship between lake chemistry parameters and Common Loon blood mercury concentrations at selected sites across North America. OKSANA PITERMAN LANE*, PETER S. REAMAN, BioDiversity Res. Inst., Freeport, ME; and DAVID C. EVERS, Univ. Minn., St. Paul, MN and BioDiversity Res. Inst.

Water chemistry parameters (lake pH, alkalinity, and apparent color) were measured in selected lakes across the Common Loon breeding range from New England to Alaska. We collected corresponding blood samples from adult and juvenile Common Loons that were analyzed for total mercury (Hg) concentrations. Adult and juvenile blood Hg concentrations show a strong negative correlation with lake pH and alkalinity; loons from the lowest pH and alkalinity lakes had the highest blood Hg levels. No significant relationship was observed between loon blood Hg and apparent color. The results of this study support previous findings of the effects of lake pH on loon blood Hg in Wisconsin lakes. Our results can help in loon conservation efforts by targeting lakes with low pH (<6.3) to monitor and assess effects of elevated mercury concentrations on loon's health and reproductive success.

Loon /Diver Bibliography

Up-dating of references, 1995-onwards

Compiled by MATS O. G. ERIKSSON

I have concentrated the up-dating to Scandinavian references. But I have also included some pre-1995 and/or non-Swedish references, which I have found relevant or useful for my own work but not listed by McIntyre, J. W. and N. G. Cutler (1995. Annotated bibliography of the loons, Gaviidae. North American Loon Fund, Gilford, NH).

Ahlgren, C.-G. 1996 Rapport från Projekt Storlom: Kroksjö - den perfekta storlomssjön?! Fåglar i Södra Älvsborg 22:42-44.

High breeding success of *Gavia arctica* in an acid lake devoid of fish.

Andres, B. A. 1993. Foraging flights of Pacific, *Gavia pacifica*, and Red-throated, *G. stellata*, Loons on Alaska's coastal plain. Canadian Field-Naturalist 107:238-240.

Arvidsson, B., U. Boström, B. Dahlén, A. De Jong, U. Kolmodin and S. G. Nilsson. 1992. The importance of mires as breeding habitat for wetland birds in Sweden. Ornis Svecica 2:67-76.

Includes estimates of breeding densities of *Gavia stellata* in different regions of Sweden.

Borgström, E. 1993 Smålommen *Gavia stellata* som häckfågel i mellersta Värmland. Värmlandsornitologen 21:44-49.

On *Gavia stellata* in Värmland County, Central Sweden, including results from long-term studies from the 1950's onwards.

Borgström, E. 1996. Smålommen i Hagfors kommun 1995. Värmlandsornitologen 24:45-50.

Information on the selection of fishing waters, lakes with *Coregonus alburnus* are preferred.

Dahlén, B. 1997. Inventering av smålom i Malungs socken 1996. Fåglar i Dalarna 30:3-10.

On *Gavia stellata* in Central Sweden, including information of breeding success in relation to distance between nesting terns and fishing lakes.

Danielsen, F., H. Skov and J. Durinck. 1990. Estimates of the wintering population of Red-Throated Diver *Gavia stellata* and Black-throated Diver *Gavia arctica* in northwest Europe. Proc. Nordic Congr. Ornithol. 7:18-25.

Dickson, D. L. 1994. Nesting habitat of the Red-throated Loon, *Gavia stellata*, at Toker Point, Northwest Territories. Canadian Field-Naturalist 108:10-16

Douhan, B. 1997. Storlom i Uppland 1996. Fåglar i Uppland 24:24-37.

Increase in population size of *Gavia arctica* in East Central Sweden.

Durinck, J., H. Skov and P. Andell. 1993. Seabird distribution and numbers in selected offshore parts of the Baltic Sea, winter 1992. Ornis Svecica 3:11-26.

Information on *Gavia stellata* and *G. arctica*, including newly detected wintering waters in South Baltic.

Durinck, J., H. Skov, F. Danielsen and K. D. Christensen. 1994. Vinterføden hos Rødstrupet Lom *Gavia stellata* i Skagerrak. - Dansk Orn. Foren. Tidsskr. 88:39-41.

Winter food of *Gavia stellata*.

Eriksson, M. O. G., C.-G. Ahlgren, R. Fallberg, G. Karlsson and H. Kongbäck. 1995. The breeding success of Black-throated Diver *Gavia arctica* in southwestern Sweden, 1982-1992. Ornis Svecica 5:1-14.

Eriksson, M.O.G. and I. Johansson. 1997. The red-throated Diver *Gavia stellata* in southwest Sweden: population trend and breeding success. Ornis Svecica 7:1-10.

Declining trend halted, and indications of re-occupation of previously abandoned breeding terns as well as of establishment at new breeding sites are recorded. Possible positive effects on fish stocks in acid but lime-treated freshwater lakes are discussed.

Eriksson, M. O. G. and P. Lindberg. 1995. Projekt Lom 1994. In: SOF. 1995. Fågelåret 1994, pages 52-55. Sveriges Ornitologiska Förening, Stockholm.

Eriksson, M. O. G. and P. Lindberg. 1996. Projekt Lom 1995. In: SOF. 1996. Fågelåret 1995, pages 49-51. Sveriges Ornitologiska Förening, Stockholm.

Eriksson, M. O. G. and P. Lindberg. 1997. Projekt Lom 1996. In: SOF. 1997. Fågelåret 1996, pages 51-54. Sveriges Ornitologiska Förening, Stockholm

Eriksson, M. O. G. and P. Lindberg. 1997. Storlom och smålom i sydvästra Sverige. In: Josefsson, K and L. Olsson, eds. Miljötilståndet i Älvsborgs län. Länsstyrelsen i Älvsborgs län Rapport 1997:6, pages 34-39.

Long-term data on the breeding success of *Gavia stellata* (1980-97) and *G. arctica* (1968-97) indicate no declining trend but large fluctuations between years, with an overall low breeding success but with single years with exceptionally high production of chicks.

Folkestad, A. O. 1994. Smålom *Gavia stellata*. In: Gjershaug, J. O., P. G. Thingstad, S. Eldøy and S. Byrkjeland (eds.). Norsk Fugleatlas, pages 30-31. Norsk Ornitologisk Forening, Klæbu.

Information about the status of *Gavia stellata* in Norway, based on results from the Norwegian Bird Atlas project

Folkestad, A. O. 1994. Storlom *Gavia arctica*. In: Gjershaug, J. O., P. G. Thingstad, S. Eldøy and S. Byrkjeland (eds.). Norsk Fugleatlas, pages 32-33. - Norsk Ornitologisk Forening, Klæbu.

Information about the status of *Gavia arctica* in Norway, based on results from the Norwegian Bird Atlas project

Folvik, A. and A. T. Mjøs. 1995. Spring migration of White-billed Divers past southwestern Norway. *British Birds* 88:125-129.

Ford, T.B and J. A. Gieg. 1995. Winter behavior of the Common Loon. *J. Field Ornithol.* 66:22-29.

Gibbons, D. W., M. I. Avery and A. F. Brown. 1996. Population trends of breeding birds in the United Kingdom since 1800. *British Birds* 89:291-305.

Includes information on *Gavia stellata*, *G. arctica* and *G. immer*.

Gibbons, D. W., I. P. Bainbridge, G. P. Mudge, A. P. Tharme and P. M. Ellis. 1997. The status and distribution of the Red-throated Diver *Gavia stellata* in Britain in 1994. *Bird Study* 44:194-205.

Gilbert, G., P. K. McGregor and G. Tyler. 1994. Vocal individuality as a census tool: practical considerations illustrated by a study of two rare species. *J. Field Ornithol.* 65:335-348.

Gavia arctica and *Botaurus stellaris*.

Granlund, J. 1953. Birdskin caps. A cultural element of the Arctic and Northern Countries. *Ethnos* 18:125-142.

Interesting information about the use of loon skins

Grote, H. 1950. Zur Kenntnis des Prachtauchers (*Colymbus arcticus* L.). *Der Zoologische Garten* 17:87-90.

Groves, D. J., B. Conant, R. J. King, J. I. Hodges and J. G. King. 1996. Status and trends of loon populations summering in Alaska, 1971-1993. *Condor* 98:189-195.

Götmark, F., R. Neergaard and M. Åhlund. 1988. Storlommen i Fegen-Svansjöarna-Kalvsjön. - Länsstyrelsen i Älvsborgs län, rapport 1988:8

Detailed information on *Gavia arctica*.

Haga, A. 1980. Management of the Black-throated diver (*Gavia arctica*) and the Osprey (*Pandion haliaetus*) as breeding birds at oligotrophic freshwater lakes. *Fauna (Oslo)* 33:10-17. (In Norwegian).

Jensen, P. 1977. Studier av flockbeteenden hos storlom (*Gavia arctica*). *Zoologisk Revy* 39:131-139.

Valuable, but little known contribution to the studies of flocking behavior in *Gavia arctica*.

Johansson, I. 1991. Projekt Smålom: Inventering av smålom i södra Älvsborg och norra Halland 1990. *Fåglar i Södra Älvsborg* 17:27-35.

Gavia stellata in South-west Sweden.

Jonsson, L. 1996. Stillahavslo - förekomst och fältbestämning. *Vår Fågelvärld* 55, nr 2:8-14.

Identification of *Gavia pacifica*.

Jonsson, L. and T. Tysse. 1992. Lommar. Art- och åldersbestämning samt ruggning hos smålom *Gavia stellata*, storlom *Gavia arctica*, islom *Gavia immer* och vitnäbbad islom *Gavia adamsii*. *Vår Fågelvärld*, Suppl. 15. Sveriges Ornitologiska Förening, Stockholm.

Identification guide and moulting patterns, color illustrations.

Kertell, K. 1996. Response of Pacific Loons (*Gavia pacifica*) to impoundments at Prudhoe Bay, Alaska. *Arctic* 49:356-366.

Koskimies, P. 1993. Population sizes and recent trends of breeding birds in the Nordic countries. *Vatten- och miljöförvaltningens publikationer, serie A 144*. Tryckericentralen AB, Helsinki.

Information on *Gavia stellata* and *G. arctica*.

Larsson, L. and Å. Pettersson. 1994. Inventering av Sotterns fågelliv 1994. *Fåglar i Närke* 17:119-124.

Information on *Gavia arctica*.

Marchant, J. H., R. Hudson, S. P. Carter and P. Whittington. 1990. Population trends in British breeding birds. British Trust for Ornithology, Tring.

Information on *Gavia stellata* and *G. arctica*

McNicol, D. K., M. L. Mallory and H. S. Vogel. 1995. Using volunteers to monitor the effects of acid precipitation on Common Loon (*Gavia immer*) reproduction in Canada: The Canadian Lakes Loon Survey. - *Water, Air, Soil Pollut* 85:463-468.

Merrie, T. D. H. 1996. Breeding success of raft-nesting divers in Scotland. *British Birds* 89:303-309.

Meyer, M. W., D. C. Evers, T. Daulton and W. E. Braselton. 1995. Common Loons (*Gavia immer*) nesting on low pH lakes in northern Wisconsin have elevated blood mercury content. *Water Air Soil Pollut* 80:871-880.

North, N. R. 1993. Distribution and migration of Yellow-billed Loons in North America. *Bird Populations* 1:36-49.

North, N. R. 1994. Yellow-billed Loon *Gavia adamsii*. *The Birds of North America*, No 121.

Okill, J. D. 1994. Ringing recoveries of Red-throated Divers *Gavia stellata* in Britain and Ireland. *Ringling & Migration* 15:107-118.

Pakarinen, R. 1989. A survey of the Black-throated Diver population in 1985-86 in Finland. *Lintumies* 24:2-11 (In Finnish, English summary).

Pakarinen, R. and O. Järvinen. 1984. The Red-throated Diver *Gavia stellata* in Finland: a population ecological analysis of its status and population trends. *Lintumies* 19:46-54 (In Finnish, English summary).

Piper, W. H., D. C. Evers, M. W. Meyer, K. B. Tischler, J. D. Kaplan and R. C. Fleischer. 1997. Genetic monogamy on the common loon (*Gavia immer*). *Behav. Ecol. Sociobiol.* 41:25-31.

Pirak, L. 1983. Nåjden Pirak. Thule - Norrländsk kulturtidskrift 1983, nr 5:59-62.

On loons in the Sami mythology

Roalkvam, R. 1985. Breeding distribution of Red-throated Diver and Black-throated Diver in Norway. Vår Fuglefauna 8:23-27. (In Norwegian, English summary)

Scheuhammer, A. M. and K. M. Dickson. 1996. Patterns of environmental lead exposure in waterfowl in Eastern Canada. *Ambio* 25:14-20.

Scheuhammer, A. M. and S. L. Norris. 1996. The ecotoxicology of lead shot and lead fishing weights. *Ecotoxicology* 5:279-295.

Schmidt, G. A. J. 1975. Zur Verbreitung und Ökologie der Seetaucher, Gaviidae, insbesondere in und um Schleswig-Holstein. *Berichte des Vereins "Natur und Heimat" und des Naturhistorischen Museums zu Lübeck* 13/14:44-108.

Skyllberg, U., J. Lessman and P. Hansson. 1994. Smålommen i Västerbottens södra kustland. *Fåglar i Västerbotten* 19:8-10.

A coast breeding *Gavia stellata* population in North Sweden

Solovev, M. Y. 1992. Comparative ecology of divers nesting in seaside tundra of Chukotski Peninsula. - *Byulletin Moskovskogo Obshchestva Ispytatelei Prirody Otdel Biologicheskii* 97(6):18-28 (In Russian, summary in English).

Spitzer, P. R. 1995. Common loon mortality in marine habitats. *Environmental Reviews* 3:223-229.

Tucker, G. M. and M. F. Heath, eds. 1994. *Birds in Europe: their conservation status*. BirdLife International (BirdLife Conservation Series No. 3), Cambridge.

Chapters on *Gavia stellata* and *G. arctica*.

Töttö, P. 1995. The Red-throated Diver in Pirkanmaa, 1994. *Lintumies* 20: 0-54 (In Finnish, summary in English).

Uddén, J. and L. Vikengren. 1980. Storlom dödade viggas. *Fåglar på Västkusten* 14:167.

Note on *Gavia arctica* killing *Aythya fuligula*.

Weir, D. N., R. Y. McGowan, A. C. Kitchener, S. Mcorist and M. Heubeck. 1996. Effects of oil spill and shooting on Great Northern divers which winter in Scotland. *Dansk Orn. Foren. Tidsskr.* 90:29-33.

Williams, J. M., M. L. Tasker, I. C. Carter and A. Webb. 1995. A method of assessing seabird vulnerability to surface pollutants. *Ibis* 137, supplement, pages 147-152.

Highest vulnerability scores for Gaviidae and *Cephus grylle*.

Ylvén, R. 1989. Storlom i Kronobergs län - en redovisning av en inventering 1985-87. *Milvus* 19:1-5.

The Status of Loons in Alaska - A Preliminary Needs Assessment

From a synthesis by: Brian J. McCaffrey

Prepared under the auspices of the Alaska Loon Working Group

Red-Throated, Arctic, Pacific, Common, and Yellow-Billed loons nest in Alaska, and all but the arctic loon are regular and common breeders in at least some regions of the state. In fact, the number and diversity of loons in Alaska may be unmatched anywhere in the world. Because of their evocative calls and their association with wilderness, loons generate a romantic mystique that extend interest in their welfare beyond that of conservation biologists. Despite this widespread appeal and their potential importance as

indicators of environmental health, the status of loons in Alaska is not well understood. Information is fragmentary, relatively limited, and has not been widely disseminated.

To improve this situation, and in response to documented declines in some Alaskan loon populations, the Alaska Loon Working Group held its first meeting on 5 December 1997. Convened by Brad Andres (U.S. Fish and Wildlife Service, Migratory Bird Management, Alaska) and Dave Evers (BioDiversity Research Institute, Freeport, Maine), the meeting attracted more than 25 loon biologists and enthusiasts that represented a wide range of interests, including federal and state governments, non-government organizations, consulting firms, industry, and private citizens. For the first time, information and insights about Alaska's loons were shared in a common forum. Investigators presented data on Alaska loon populations, and the conservation implications of their findings were discussed by the group. The working group decided to first produce a Preliminary Needs Assessment to review population status and information needs, and to later produce a Final Needs Assessment that would critically scrutinize available data, identify threats, and suggest research priorities.

This report represents the first phase of the Working Group's needs assessment. We briefly summarize current knowledge about the status of Alaska's loon populations, highlight major data gaps, and identify loon conservation management issues. The conclusions about population trends presented here rely heavily on the work of pilot-biologists and observers who have flown aerial surveys for Migratory Bird Management, U.S. Fish and Wildlife Service. The contribution of these individuals, both past and present, cannot be overestimated. Without their foresight, dedication, and skill, we would have no quantitative basis for addressing loon conservation in Alaska. *

General Conclusions: There is cause for concern about Alaska's breeding Loons. Each of the three widely-distributed species has suffered either local or regional declines over the past two decades, and the fourth species (Yellow-billed Loon) is vulnerable due to its small population size and limited geographic range. With the exception of aerial survey data, or knowledge about Alaska's breeding loons is relatively shallow and fragmentary. Few site-specific studies of breeding biology have been undertaken, and it is unclear to what extent results can be extrapolated across the species' ranges. Our understanding of loon distribution and ecology away from the breeding grounds is even poorer. Several major gaps common to all four species include information on:

- 1) demographic parameters (e.g., productivity, survival, age of first breeding),
- 2) wintering distribution, including concentration areas and timing of use,
- 3) use of marine environment during breeding and non-breeding seasons,
- 4) anthropogenic effects on loon survival and productivity (e.g., recreation, research, energy development, subsistence, incidental take in gill nets, and exposure to contaminants),
- 5) detailed survey data on species that are rare (e.g., Yellow-billed Loon) or that occur in areas presently or potentially exposed to high levels of human disturbance (e.g., Matanuska-Susitna Valley, NPR-A),
- 6) data on habitat use, availability, and quality in relation to loon abundance and productivity,
- 7) relationships between loon population trends and the status of fish stocks in both the breeding and wintering areas,
- 8) patterns of recolonization after population declines or extirpation, and
- 9) data on population trends in Canada, especially for yellow-billed loons, that would enable us to interpret Alaska data in rangewide context.

Improving our understanding of loon biology, however, is only part of the loon conservation equation. Any successful conservation effort should include public education; the potential for using loons in an Alaskan education program is enormous. The diversity, abundance, and aesthetic appeal of loons in Alaska provide a unique educational opportunity to promote the conservation of loons, wetlands, and wildlife in general. The Anchorage Audubon Society holds a very popular Loon Festival each year and North American Loon Fund has published posters and booklets that highlight Alaska's Loons. Both programs are important steps in building public support for loon conservation.

Elsewhere in North America, active conservation efforts, have been required to maintain or restore loon populations suffering from anthropogenically-caused declines in reproductive success. A number of

specific management techniques have been developed and successfully implemented. Although active restoration is not needed for most loon populations in Alaska, these efforts have demonstrated that, with enough information, active loon management can be both practical and effective.

Encouraged by success elsewhere, the Alaskan Loon Working Group recognizes the need to synthesize and distribute information on Alaska's Loons. At the same time, the Working Group wants to promote the collection of additional data necessary for devising constructive management strategies. To these ends, the Alaska Loon Working Group is currently compiling a loon project directory, has instituted an e-mail list to improve communication among members, and will be producing a detailed needs assessment later in 1998. We look forward to increased collaboration with our Canadian colleagues, and we encourage them, particularly those involved in aerial waterfowl surveys, to record loon observations as a standard part of their survey protocols. We hope that these preliminary steps will help educators, managers, biologists, and other concerned citizens to more effectively promote loon conservation in Alaska.

*For a full report contact:

Brian J. McCaffery
USFWS-Yukon Delta NWR
PO Box 346
Bethel, Alaska 99559

The Northeast Loon Study Workgroup: Cooperation in Action

Sally Stockwell, Maine Audubon Society. Excerpts from the North American Loon Fund newsletter.

How many people does it take to study mercury and lead poisoning in loons in the Northeast? The Northeast Loon Study Workgroup is stretching the definition of cooperation to new limits, bringing together wildlife and fisheries biologists, conservation biologists, behavioral ecologists, veterinarians, and toxicologists from 14 different organizations. Members represent environmental consulting firms, state and federal wildlife agencies, University professors and students, state environmental protection agencies, private corporations, and conservation organizations from both the United States and Canada. The once small group began meeting in 1994 to work together to determine just what the risk of mercury was to loons in the Northeast. The group, up to 30 members now, last met in May at the Loon Preservation Committee, Moultonborough, New Hampshire to share data from the 1995-97 seasons, exchange ideas about what additional information should be collected, logistics for the 1998 field season, and plans for several educational initiatives.

Several members of the Workgroup have commented on the unique cooperative nature of the group as being unusual among researchers. Perhaps it is. The Workgroup succeeds because the many member organizations are committed to protecting the common loon and its habitat, and realize that the puzzle that defines and limits the threats facing the loon has too many pieces for one person to solve alone.

Other News

The Washington Department of Fish and Wildlife is reviewing the status of Common Loons for possible state listing. A draft "Washington State Status Report of the Common Loon" will be issued for a 90-day comment period beginning 15 June 1999. A final report and listing recommendation will be issued by November. To be added to the loon mailing list, contact the agency at wildthing@dfw.wa.gov or telephone (360) 902-2515. For information on Washington's common loons or the state listing process, contact Scott Richardson at richasar@dfw.wa.gov or telephone (360) 902-2362.

Editor's Note

The Wetlands International Diver/Loon Research Group Newsletter is co-edited by Joseph Kerekes, Canadian Wildlife Service & Dave Evers of the private research group, BioDiversity Research Institute. Send all correspondence or articles for submission to:

Joseph Kerekes

Environment Canada

45 Alderney Drive

Dartmouth N.S., B2Y 2N6, Canada

(902) 426-6356, Fax: (902) 426-4457

Joseph Kerekes, Coordinator of the Diver/Loon Specialist Group Wetland's International; e-mail:

joe.kerekes@ec.gc.ca