

HABITAT USE BY BREEDING COMMON LOONS
(*GAVIA IMMER*) IN THE ATLANTIC REGION
NATIONAL PARKS IN CANADA

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The breeding common loon populations are monitored where they occur in the National Parks in the Atlantic Region (Kejimikujik, Cape Breton Highlands, Fundy, Terra Nova, Gros Morne) and in the Experimental Ponds Area, ~100 km west of Terra Nova National Park in Newfoundland. The monitoring effort goes back to 1982 in Kejimikujik National Park while it commenced in 1997 in Terra Nova, Gros Morne National Parks. The lakes range from oligotrophic to ultra-oligotrophic. Overall, the adult population remained stable, with considerable year to year variation in reproductive success. Nutrients (phosphorus) through fish production controlled the lake size that is required to breeding success. In oligotrophic lakes > 40 ha were required to support a chick to fledging while in ultra-oligotrophic lakes >120 ha or several smaller lakes were needed as a territory to raise chicks. Smaller lakes < 20 ha or less, close to the sea or to large lakes, where adults could fly to feed were able to support chicks to fledging (Fundy, Terra Nova). In spite of the great abundance of lakes of different sizes, breeding loons were observed only in one lake in Gros Morne National Park in Western Newfoundland. A mountain range on the Eastern boundary of the park prevents loons from moving in from the Atlantic side of Newfoundland.

Key words: Common loon, loon breeding success, national parks

INTRODUCTION

With the completion of the aquatic resource inventories in the national parks in the Atlantic Region of Canada in the 1970's, a sound background was established of the limnological conditions (Fig. 1), (KEREKES *et al.* 1995, KEREKES & SCHWINGHAMER 2002). That made possible the investigation of waterbird populations in a limnological context in the Atlantic national parks. An intensive study of waterbird populations began in Kejimikujik National Park within the context of the national acid precipitation program in 1988 (KEREKES 1989). Encouraged by the findings of this program, investigations of the common loon were extended to other national parks (Kejimikujik, Cape Breton Highlands, Fundy, Terra Nova, Gros Morne) as well as in the Experimental Ponds Area, ~100 km West of Terra Nova National Park in Newfoundland).

RESULTS AND DISCUSSION

The intensity of the surveillance of the study lakes during the breeding season is given by KERÉKES *et al.* 1996, CLAY *et al.* 2004 and HOPE 2006.

Kejimikujik National Park

The common loon (*Gavia immer*) is a prominent waterbird inhabiting most of the 40 oligotrophic lakes within Kejimikujik National Park (KNP), Nova Scotia, Canada (KERÉKES 1995). From 1988 to 1995, the Canadian Wildlife Service carried out a common loon population study of park lakes, and determined a resident loon population of 39 pairs on 25 lakes (KERÉKES *et al.* 1996). Loons utilized lakes



Fig. 1. Location of national parks supporting common loon populations in the Atlantic Region of Canada

of 20 ha or more and usually bred successfully on lakes averaging 40 ha or greater in area (KEREKES 1990, KEREKES *et al.* 1994). Lakes in the 80–120 ha range may support two breeding pairs and lakes >120 ha support more. It was estimated that about 40 ha are required to produce enough fish to support two adult loons and a chick to fledging in those lakes. A common loon monitoring program 18 of the more accessible lakes, described in the loon population study, was initiated in 1996 (HOPE 2006). The number of adult loons remained stable during the last 18 years (KEREKES *et al.* 2008). All suitable habitats (lakes) are occupied by adult loons including marginal sites (<40 ha). Loons from the smaller lakes fly regularly to the larger lakes to feed. A large number of young non-breeding loons spend their summers in the ocean. The relative closeness to the seacoast (~40 or 60 km in two directions) ensures that all suitable territory, when they become vacant, including marginal ones, are soon filled in the spring migration. This may give an explanation of the low ratio (0.32) of loon chick/territorial pair in Kejimikujik compared to other more continental populations (>0.5) distant from the sea (KEREKES *et al.* 1994).

Cape Breton Highlands National Park

The park has a large number of lakes but only two lakes, Warren (89.8 ha) (oligotrophic) and Freshwater (42.2 ha) (oligo-mezotrophic) are of sufficient size to support loon chicks regularly to fledging (KEREKES 1983).

Fundy National Park

One small lake, Wolfe (22 ha), support loon chicks regularly to fledging. The adult loons fly away regularly to larger lakes outside the park and to the sea for feeding (CLAY *et al.* 2004).

Terra Nova National Park

In Terra Nova National Park several larger lakes, all close to the sea are not occupied by resident loons (KEREKES *et al.* 2000). One large lake (173 ha) regularly produces chicks which soon became victims of predation by Black backed gulls breeding on the same lake. Two smaller lakes (28 ha & 20 ha) however occasionally support breeding loons. These lakes are both close to the sea where the adults can feed regularly.

Experimental ponds area

The Experimental Ponds Area is located ~100 km west of Terra Nova National Park in Newfoundland. Three oligotrophic lakes were fertilized for several years in an fisheries research study. The year after the first fertilization, loons began to produce chicks for five years on a previously unoccupied lake (25.7 ha). They utilized the additional fish production resulted from the fertilization (KEREKES *et al.* 2000, KNOECHEL *et al.* 2000). After fertilization stopped, the lake was abandoned by the breeding loons. KERKES *et al.* (2000) found that in the general area, because of the low rate of fish production, the loons depended on larger lakes (>140 ha) or several smaller lakes for a breeding territory.

Gros Morne National Park

The park has a great abundance of lakes yet only one lake has a record of breeding success by loons. Apparently the mountain range on the Eastern boundary with a tundra like environment poses a sufficient barrier to prevent loons from moving in from the Atlantic side of Newfoundland.

CONCLUSION

Common loon populations occur in five national parks in the Atlantic region where suitable habitat exists. Nutrients (phosphorus) through fish production determines the minimum size of the lake required to support successful raising the young to fledging (KEREKES 1990, 2002). The density of the breeding loons declines toward the North as the growing season shortens with a declining fish production (KEREKES *et al.* 2000).

REFERENCES

- CLAY, D., BUTLAND, S., EBERHARDT, E. & KERKES, J. (2004) Monitoring of Common Loon breeding success on Wolfe Lake, Fundy National Park. *In*: WELLS, P. G., DAYBORN, G. R., PERCY, J. A., HARVEY, J. & ROLSTON, S. J. (eds): Health of the Bay of Fundy. Proceedings of the 5th Bay of Fundy Science Workshop and Coastal Forum, "Taking the Pulse of the Bay", Wolfville, Nova Scotia. May 13–16, 2002. Environment Canada Atlantic Region, Occasional Report No. 21, Pp. 121–122. Environment Canada, Dartmouth, Nova Scotia and Sackville, New Brunswick, 416 pp. *Canadian Wildlife Service Occasional Report* **21**: 13–16.
- HOPE, P. (2006) Six years of monitoring the common loon (*Gavia immer*) population on 16 lakes in Kejimikujik National Park, Nova Scotia, Canada. Pp. 8–16. *In*: HANSON, A., KERKES, J. & PAQUET, J. (eds): Limnology and Aquatic Birds: Abstracts and selected papers from the 4th

- Conference of the Societas Internationalis Limnologiae (SIL) Aquatic Birds Working Group. *Canadian Wildlife Service Technical Report Series*. 474. Atlantic Region. xii + 203 pp.
- KEREKES, J. (1983) Predicting trophic response to phosphorus addition in a Cape Breton Island lake. *Proceedings Nova Scotia Institute of Science* **33**: 7–18.
- KEREKES, J. J. (ed.) (1989) Acidification of organic waters in Kejimikujik National Park, Nova Scotia, Canada. Wolfville, Nova Scotia, Oct. 25–27, 1988. *Symposium Proceedings Reprinted from Water, Air and Soil Poll.* 46/1–4. Kluwer Academic Publ. Dordrecht, Netherlands. 432 pp.
- KEREKES, J. (1990) Possible correlation of Common Loon population with the trophic state of a water body. *Verh. International Verein. Limnology* **24**: 349 – 353.
- KEREKES, J. J. (1998) Problems associated with prediction of aquatic bird biomass from total phosphorus concentration. *Verh. International Verein. Limnology* **26**: 2343–2646.
- KEREKES, J. (2002) Loons from a limnologist's perspective. *Verh. International Verein. Limnology* **28**: 504–506.
- KEREKES, J., BATES D., DUGGAN, M. & TORDON, R. (1994) Abundance and distribution of fish-eating birds in Kejimikujik National Park (1988–1993). Pp. 197–204. In: STAICER, C. A., DUGGAN, M. & KEREKES, J. (eds): Proc. Workshop, Kejimikujik Watershed Studies: Monitoring and Research, Five Years After “Kejimikujik ‘88”. *Oc. Rep. Environment Canada, Sackville N.B.* 276 pp.
- KEREKES, J. DUGGAN, M., BATES, D., TORDON, R. & BOROS, G. (1997) Abundance and distribution of fish eating birds in Kejimikujik National Park, Nova Scotia, Canada. *Wetlands International Publication* **43**: 81–90.
- KEREKES, J. J., KNOECHEL, R., RYAN, P. M. & STROUD, G. (2000) Common Loon breeding success in oligotrophic lakes in Newfoundland Canada. *Verh. International Verein. Limnology* **27**: 171–174.
- KEREKES, J. & MASSE, D. (2000) Comparison of Common Loon populations, based on long term monitoring, in Kejimikujik National Park, Nova Scotia and La Mauricie National Park, Québec, Canada. Pp. 66–68. In: MCINTYRE, J. W. & EVERS, D. C. (eds) Loons: Old history and new findings. *Proc. Symp, Symposium from the 1997 meeting, American Ornithologists' Union. North American Loon Fund*, Holderness, N.H., USA. 115p.
- KEREKES, J., TORDON, R., NIEUWBURG, A. & RISK, L. (1994) Fish eating bird abundance in oligotrophic lakes in Kejimikujik National Park, Nova Scotia, Canada. *Hydrobiologia* **279–280**: 57–61.
- KEREKES, J., BEATTIE, B. & POLLOCK, T. (1995) Status of long term integrated monitoring in Kejimikujik National Park”. Pp. 326–331. In: HERMAN, T. B., BONDRUP-NIELSEN, S., MARTIN, J. H. & MUNRO, N. W. P. (eds): Proceedings 2nd International Conference on Science and the Management of Protected Areas. Dalhousie U. Halifax. May 19, 1994. SAMPA, Acadia University, Wolfville, N. S. 590 pp.
- KEREKES, J., HOPE, P., MCCARTHY, C. & O'GRADY, S. (2008) Long term monitoring of the common loon (*Gavia immer*) population on 18 lakes in Kejimikujik National Park, Nova Scotia, Canada since 1988. *Verh. Internat. Verein. Limnol.* **30** [in press]
- KEREKES, J. & SCHWINGHAMER, P. (2002) *Atlantic Canada National Park Aquatic Resources Inventories: Kejimikujik, Gros Morne, and Cape Breton Highlands*. Environment Canada – Atlantic Region. No. 20. CD ROM.
- KNOECHEL, R., RYAN, P. M., CLARKE, K. D. & KEREKES, J. J. (2000) Ecosystem responses to lake fertilization as a habitat improvement technique in central Newfoundland, Canada. Pp. 37–47. Canadian Society of Environmental Biologists, *Proceedings 37th Annual Meeting, Canadian Society of Environmental Biologists. Edmonton*, Sept. 28–30, 1997, Toronto. Ontario.

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