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LOON WATCH – 25 YEARS OF SUCCESSFUL VOLUNTEER CITIZEN SCIENCE AT KEJIMKUJIK NATIONAL PARK, NOVA SCOTIA

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Stemming from previous research, in 1988 the Canadian Wildlife Service (CWS), part of Environment Canada, launched a new study of the abundance and distribution of water birds in Kejimkujik National Park and National Historic Site (Kejimkujik) (Kerekes 1990a). The emphasis was on the Common Loon (*Gavia immer*) on Kejimkujik's lakes and was within the ongoing long-range transport of air pollutants (LRTAP) program. This Common Loon population study in later years attracted other investigations of the Common Loon on the same lakes (Burgess *et al.* 1998, Nocera &Taylor 1998, Hope 2006).

Dr. Joe Kerekes viewing a loon nest at Kejimkujik National Park, during a summer of the Loon Watch. Photo credit: Peter Hope.

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The study, which lasted from 1988 to 1995, when it was terminated by the CWS, included 25 lakes that were of sufficient size to support breeding loons. Within Kejimkujik, the 25 chosen oligotrophic lakes hosted a stable population of 39 pairs of Common Loons (Kerekes 1990b, 1998, 2002, Kerekes *et al*. 1995). It was determined that lakes greater than 20 hectares could support at least one pair of loons. Lakes greater than 40 hectares could support more pairs of successfully nesting loons. Lakes greater than 80 hectares could support more pairs. Successful reproduction of loons was closely associated with lakes that had a greater amount of fish biomass (Kerekes *et al*. 1994).

In 1995, it was decided to include volunteers to help with the study, surveying the lakes simultaneously. Twenty-one people were assembled by Joseph Kerekes and Peter Hope on a nice day in August. It included some park staff, CWS researchers, and volunteer friends of Kejimkujik. They dispersed over 14 different lakes to count loons seen within a specified time period. The event was a success and this approach began in earnest in 1996 under the name of Loon Watch.

Loon Watch, from the very beginning, depended upon volunteers ("citizen scientists" has recently been the title coined for such participants). Park staff member Peter Hope had many contacts with park visitors and set out to recruit people who would bring their own canoe and related equipment, plus binoculars. From the very beginning, standardized forms were used and every Loon Watch began with a meeting where details of identification of loon chicks, surveying time, and data forms were discussed. Each team was assigned a lake or portion of a larger lake. The meeting ended shortly after 10:00 AM to allow all surveyors to reach their assigned lake.

Many teams had to travel back-woods roads, some had to canoe and portage to reach their survey lake. The survey itself had to be done within three hours from 12:00 noon until 15:00 h on the specifically chosen Loon Watch days. Each year, the first Loon Watch took place in late May or early June to determine the distribution of adult birds and also to record any incidentally detected nests. The second Loon Watch occurred during the third week of August to document the distribution of adults and record details of all Common Loon broods. The age of the chicks, classified as downy, small or large young, was recorded. The survival of large young, at that

late date in August, permitted yearly comparisons of the numbers likely to fledge.

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Many of the volunteers continued to take part over the years, so the program included a trained and familiar group of participants. All observations were made on standardized data sheets to record details about adult loons, nests of young loons, and even loons seen in flight. Peter Hope blended Loon Watch observations with other sightings throughout the summer, gathered incidentally by park staff and researchers. As a result, a clear picture of the loon population, the number of resident pairs, and the number and location of surviving chicks was made possible.

The Loon Watch program continues to this day, coordinated and documented by a succession of park staff including Chris McCarthy, Donna Crossland and Jennie Eaton. It has become a permanent part of the suite of Parks Canada monitoring programs to assess fresh water conditions in Kejimkujik. The goal now is to survey 18 lakes. However, the numbers of volunteers who turn up at times makes it possible to survey even more lakes.

Successful production of loon broods was found to be closely associated with lakes producing a greater amount of fish biomass (Kerekes *et al*. 1994). A study of breeding Common Loons in Ontario, in relation to lake pH and size, found that a shortage of food was the main reason for reduced breeding success on low pH lakes (Alvo 2009). The Kejimkujik study area is close to the sea and even the marginal habitats (20 hectares lakes) are always occupied every year, there are no unoccupied lakes. This may explain low breeding success compared to other studies in the interior of the continent where possibly only the best lakes have loons.

During the time period of the initial Loon Watch Programme, Burgess *et al*. (1998) of the CWS studied the effects of mercury on common loons in Kejimkujik. He found that the loons had elevated mercury concentrations and that this heavy metal was associated with reduced reproductive success. Nocera and Taylor (1998) studied many of the same lakes and found that young loons with elevated blood mercury concentrations sought rides on their parent's backs

less frequently; this behaviour increased their energy expenditure and led to the chicks being less likely to fledge.

Many factors were noted that appear to impact the reproductive success of the loons at Kejimkujik. Lake size was critical. Occasionally, spring rain floods the nests and causes egg mortality. Predation also plays a significant role as Great Black-backed Gulls *(Larus marinus)* and Bald Eagles *(Haliacetus leucocephalas)* that patrol the lakes will prey on loons as witnessed in various Nova Scotia lakes and reported to Kerekes and Hope (Pers. comm, 2021). In addition, a variety of other avian and mammalian species can potentially prey on loon eggs. Darren Reid, the Freshwater Project Manager at Kejimkujik, reports that in 2018 chain pickerel *(Esox niger)* invaded Kejimkujik waters and have now spread to virtually all monitored loon lakes. Chain Pickerel have the potential to diminish fish stocks and to prey on loon chicks (D. Reid 2021, Pers. comm.).

After 30 years, the Kejimkujik Common Loon population remains stable on the approximately 18 lakes continuously surveyed. The number of adult pairs on those water bodies is essentially the same as first documented in 1988. The number of loon chicks alive in late August in the Kejimkujik lakes varies greatly from 1 to 15 chicks in any year. The higher number of chicks is assessed as exceptionally good but the conditions leading to this are poorly understood. The continuing Loon Watch may lead to a greater understanding of loon successes and of the impact of the invasive chain pickerel.

CONCLUSIONS

The ability of the adult loon pairs to produce young in Kejimkujik lakes appears to be as good as it was more than twenty years ago, as shown by the 15 chicks recorded on the August Loon Watch in 2018. These conclusions are only possible because of the successful long-term monitoring by the Loon Watch program. Loon Watch now regularly surveys 18 or more lakes, including 16 of the 25 originally surveyed lakes (Hope 2006, Kerekes *et al.* 2009). The data from all of these years have been collected by the eager volunteers who strongly support continuation of the study by paddling Kejimkujik lakes twice per year on the Loon Watch.

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