

# Protocol Development Summary

**Protocol:** Bird Assemblages-Yellow-billed Loons

**Parks Where Protocol will be Implemented:** BELA, CAKR

**Justification/Issues being addressed:**

The enabling legislation of the parks specifies protection for bird habitats and populations for all 5 Arctic Network of Alaska Parklands (ARCN). Under ANILCA [Section 201(8)], BELA must protect habitat for internationally significant populations of migratory birds and CAKR must provide specific protections for bird habitat and populations. In addition, several international treaties, federal laws and initiatives provide protections for migratory birds and require action by NPS (Migratory Bird Treaty Act, Endangered Species Act, North American Bird Conservation Initiative).

The Yellow-billed Loon (*Gavia adamsii*) is a species of concern with a global population estimated at 16, 650-21,000 (Fair 2002, Earnst 2004). The breeding range is restricted to large lakes (>7 hectares) (North and Ryan 1989) in the Arctic Coastal Plain of Alaska north of the Brooks Range, in western Alaska on the Seward Peninsula including Bering Land Bridge National Preserve (BELA), and in Cape Krusenstern National Monument (CAKR). Yellow-billed Loons are poorly documented in these parklands and population estimates in these areas represent a small percentage of the total population. In 2005, results from aerial surveys conducted in and around BELA and CAKR generated population estimates for Yellow-billed loons and nests of 418 (90% confidence range = 314-521) and 85 (90% confidence range = 56-115), respectively (Mallek et al. 2005). The portions of the northern and central Seward Peninsula strata including BELA accounted for 76% (319) of the total Yellow-billed Loon population estimate and 76% (65) of the total nest estimate. In CAKR, the Yellow-billed Loon population and nest estimates accounted for 5% (22) and 4% (4) of the total, respectively. Due to its small population size and restricted distribution, the U. S. Fish and Wildlife Service is currently evaluating a petition to list this species as Threatened or Endangered under the Endangered Species Act.

Contaminants studies of many loon species have been ongoing in Alaska. As a piscivorous species, Yellow-billed Loons are top predators in lake ecosystems. They are harvested for human subsistence and are of concern because they may bioaccumulate contaminant loads (i.e. mercury, PCPs) (Schmutz pers. com. 2008). In addition, they may be indicators of water quality and may provide insight into the movement of marine-derived nutrients and shifts in riparian or coastal communities in ARCN.

**Specific Monitoring Questions and Objectives to be Addressed by the Protocol:**

Some of the specific monitoring questions that will be addressed by this protocol include:

1. What are the trends in occupancy of Yellow-billed Loons in selected sites of BELA and CAKR during the breeding season?

2. What are the status and trends in density estimates of Yellow-billed Loons in selected sites of BELA and CAKR during the breeding season?
3. What types and levels of contaminants are present in Yellow-billed Loons in selected sites of BELA and CAKR during the breeding season and are they changing over time?

Our specific objectives are to:

1. Determine triennial trends in occupancy of Yellow-billed Loons in selected sites of BELA and CAKR during the breeding season (June).
2. Determine triennial status and trends in density estimates of Yellow-billed Loons in selected sites of BELA and CAKR during the breeding season (June).
3. Monitor the types and levels of common contaminants (mercury, PCPs) present in Yellow-billed Loons in selected sites of BELA and CAKR during the breeding season (June).

**Basic Approach:**

Objectives 1 and 2 are the top priorities for the Yellow-billed Loons monitoring program. Objective 3 provides valuable insight into the health and status of the Yellow-billed Loon population in the selected sites of BELA and CAKR where monitoring will occur. Collection of contaminants sampled from Yellow-billed Loons involves the added logistics and costs of a fixed-wing aircraft and/or helicopter, aviation fuel, ground-based sample collection, personnel with this expertise and sample analyses. To examine contaminants in loons, ARCN will contract with the USGS/BRD to collect adult feathers (mercury), eggs (organic and inorganic contaminants) and other biological samples to assay for an array of common contaminants. Objective 3 will be approached adaptively depending on funding, staffing and allocation of time to this vital sign and could potentially be co-located with the “Lake Communities and Ecosystems Water Chemistry” vital sign.

Objectives 1 and 2 will be achieved through triennial aerial surveys using well-established methodology developed for loons and utilized by U. S. Fish and Wildlife Service in BELA and CAKR for years (Mallek et al. 2005). Adopting these methods will minimize costs and effort for protocol development. Protocol development and/or surveys will be accomplished by ARCN and U. S. Fish and Wildlife Service through a cooperative agreement. Western Arctic Parklands biologist/pilot Brad Shults has extensive experience flying various types of aerial surveys. Cross-training of in-house pilots by U. S. Fish and Wildlife Service pilots (i.e. Ed Mallek) experienced with this protocol provides additional assurance that surveys will be accomplished for the long-term and reduces costs. Surveys will be conducted with fixed-wing aircraft with one pilot and one observer counting all loons and nests observed and will occur during the breeding season (mid June) to increase the opportunity to encounter loons on nests. Population estimates and variances will be derived from expanded density estimates from the selected sample plots using standard statistical techniques for strip/plot survey analysis (Cochran 1977, Smith 1995) as per Mallek et al. (2005).

Extensive collaborative research on various aspects of Yellow-billed Loon breeding-season ecology and abundance has been ongoing on the north slope of Alaska and additional studies developing habitat models are being proposed (Schmutz pers. com. 2007; Schmutz et al. 2008). Preliminary results indicate that some lakes are consistently observed with breeding birds and others consistently lack them, implying some habitat effects on population dynamics (Schmutz et al. 2008). Results of these studies may result in refinements of techniques currently utilized by U. S. Fish and Wildlife Service (Mallek et al. 2005). Based on these data, improved habitat models may prove useful for selection of sites in BELA and CAKR where monitoring will occur.

**Principal Investigators and NPS Lead:**

The NPS leads for developing this monitoring program will be Melanie Flamme (YUGA biologist) and Brad Shults (WEAR biologist/pilot). Collaborators in this process will be: Joel Schmutz (USGS/BRD, Alaska Science Center), Ed Mallek (U. S. Fish and Wildlife Service) and Angela Matz (U. S. Fish and Wildlife Service).

**Development Schedule, Budget, and Expected Interim Products:**

Full development of the protocol will proceed on the following schedule:

- Spring 2009: Draft protocols and SOPs of survey techniques ready for peer review
- Spring 2010: Implement and test protocol (\$30,000)
- Spring 2011: Peer review and finalize protocol

**Literature Cited:**

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