

*Montana's topography is defined by the Continental Divide, which creates distinct eastern and western regions that encompass snow-covered mountains, prairie lands, and alpine forests. Glacier National Park, known for outstanding fishing and iconic wildlife such as grizzly bears and wolves, is dedicated to preserving the state's natural environments and native species. One such species, the Common Loon, is increasing after years of dedicated conservation and management efforts. Although the number of territorial pairs has increased by 21 percent since 2000, continued population health requires diligent monitoring.*

## Restore the Call: Montana Status Report for the Common Loon

The loon is a key biosentinel of aquatic integrity for lakes and near shore marine ecosystems across North America. Supported by a grant from the Ricketts Conservation Foundation, which first proposed the idea, Biodiversity Research Institute (BRI) has initiated the largest conservation study for the Common Loon. The goal is to strengthen breeding populations in their existing range and to restore loons to their former breeding range.

This work will advance our understanding of loon ecology and allow us to apply that knowledge to the restoration of ecosystems where loons once thrived. BRI is working with the Montana Common Loon Working Group and Montana's conservation plan to achieve these goals.



A Series Publication by BRI's Center for Loon Conservation in Partnership with the Ricketts Conservation Foundation

May 2015

# Status of the Breeding Loon Population in Montana

## Distribution and Movements

Montana's loon population (75 territorial pairs) is the largest within the western United States and is geographically isolated from populations in Canada.

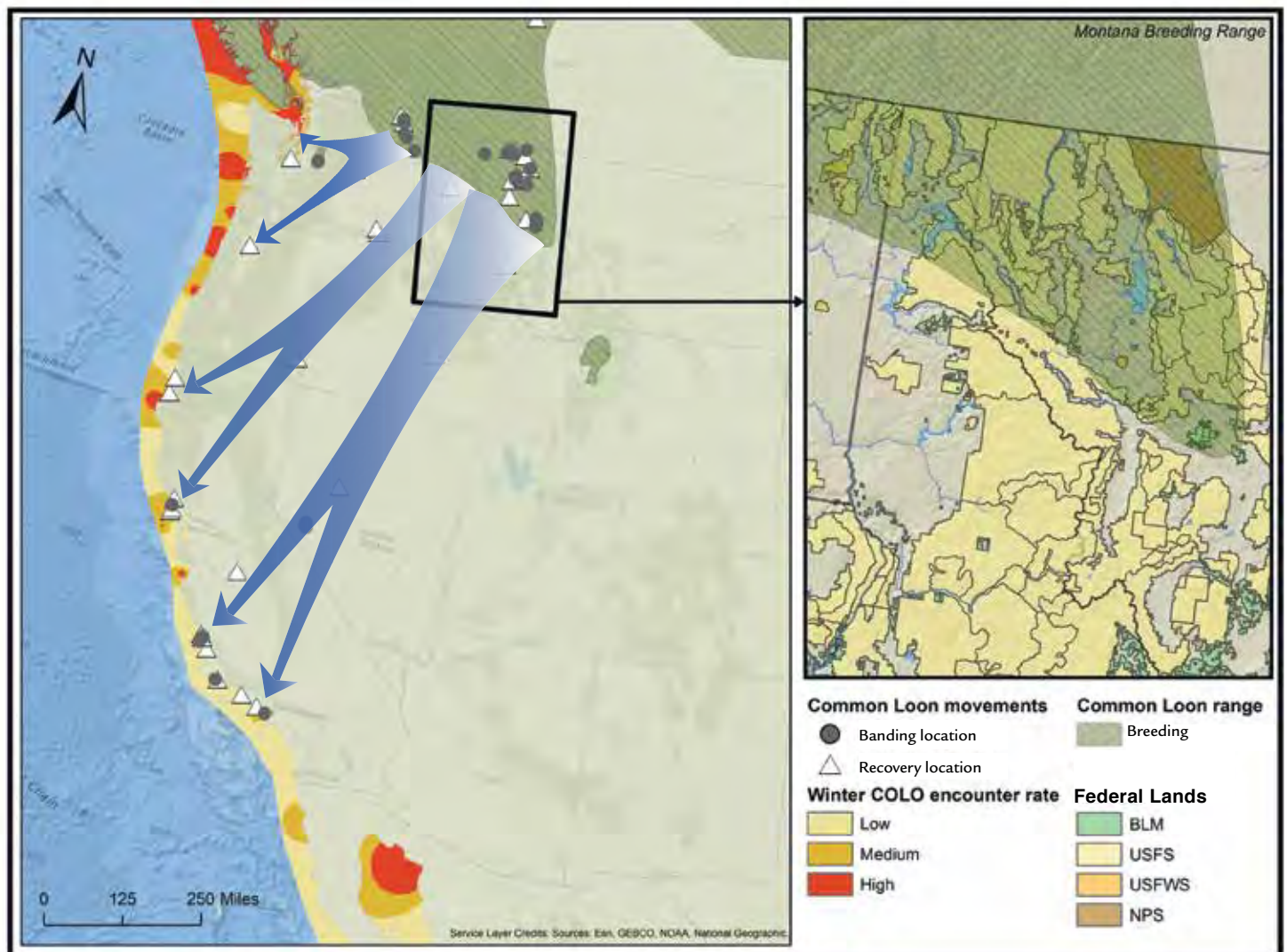
In other western states, Common Loons breed in Washington (18 pairs) and Wyoming (16 pairs; Figure 1). In total, western breeding populations are estimated at 109 territorial pairs.

Loons migrate north through Montana en route to Canadian lakes and can be observed on large reservoirs and lakes in many parts of the state. Migratory stop-over locations include Pablo National Wildlife Refuge and Flathead Lake in northwestern Montana, Clark Canyon and Canyon Ferry Reservoirs in southwestern and central Montana, and Fort Peck Reservoir in

northeastern Montana. Migrating loons are also occasionally sighted on large rivers such as the Flathead, Missouri, and Yellowstone Rivers.

Migratory loons captured in October 2006 on Flathead Lake and implanted with satellite transmitters moved to southwestern inland lakes and the Gulf of California for the winter (Hammond 2009). A subset of these loons returned to central Alberta and Saskatchewan during the nesting season.

In contrast, all the winter band observations or recoveries of Montana breeding loons have come from the West Coast, ranging from Washington to mid-California (Figure 1). Several banded loons have been retrieved or observed during the spring or fall from lakes in Idaho, Washington, and Oregon.



**Figure 1.** Breeding and wintering range for the Common Loon in the western United States. Movements are based on recoveries and observation of individuals banded under Biodiversity Research Institute's permit. The winter range densities are from the National Audubon Society's Christmas Bird Count, 2002-2012. Data from birds/party hour are log transformed.



**Figure 2.** Core areas of breeding Common Loons in Montana (Hammond 2009). Breeding loons are found primarily in northwestern Montana west of the Continental Divide and north of Missoula. The highest concentrations of nesting loons are found in the Clearwater drainage east of Missoula and the Tobacco-Stillwater drainage stretching from north of Kalispell to Eureka, west of Kalispell to the Idaho border, and in Glacier National Park.

## Conservation Concerns

The Montana Comprehensive Fish and Wildlife Conservation Strategy Plan lists the Common Loon as a species with the greatest conservation need by Montana Fish, Wildlife and Parks.

Potential threats to Montana’s loon populations include: loss of breeding habitat; direct human disturbance to shoreline nests and chicks; water level fluctuations; contaminants (e.g., lead sinkers and mercury); aquatic invasive species; and hazards in the winter (e.g., marine oil spills and fishing nets).

A long-lived species, loons have relatively low fecundity and a poor ability to colonize new areas. Thus, population levels of Common Loons in Montana may fluctuate more within core areas (Figure 2) because fragmentation and local extinctions can reach high levels near population edges (Mehlman 1997). Tracking small and relatively isolated breeding populations is therefore critical as these populations may be more sensitive to threats that could eventually effect populations in the core area. Additionally, local extinctions could be long lasting because loons generally exhibit high site fidelity and low breeding dispersal.



May 25, 2005



May 31, 2005



Above: Loons build their nests close to the water’s edge, leaving them vulnerable to water level fluctuations that can flood or strand nests.

Left: Nest with one egg on a reservoir without management provisions for shoreline nesting birds. This nest failed due to rapidly rising water following a storm event.



While motor boats represent a greater disturbance and risk to loons in open water, canoes and kayaks can access shallow areas typical of loon nesting and brood sites.

# The Success of Loons in Montana

## Learning from Montana's Banded Loons

Since 1996, a total of 111 adults and 124 chicks have been captured and uniquely color-marked in Montana. Banding has provided a mechanism for high-resolution tracking of individuals, as well as a better definition of seasonal movements and reproductive success.

Based on the coordinated mid-July surveys initiated in the mid-1980s, Montana has maintained a stable and slightly increasing breeding population. From 1999 to 2014, the number of lakes surveyed ranged from 141 to 205 with an average of  $62 \pm 10$  territorial pairs observed (Figure 3a). Over this time, the average annual production ranged from 35 to 52 with an average of  $41 \pm 14$  (Figure 3b). Unpaired or single bird counts ranged from 30 to 77 (average  $53 \pm 30$ ) and consistently represented 17 percent to 35 percent of the total annual population (average of 24 percent).

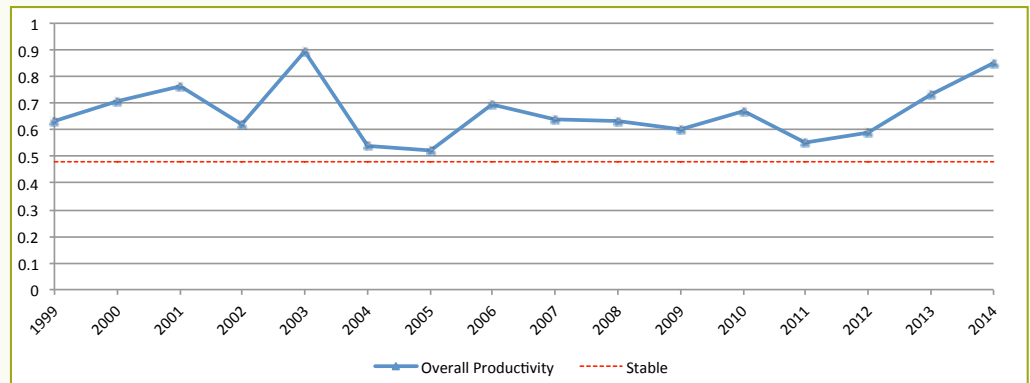
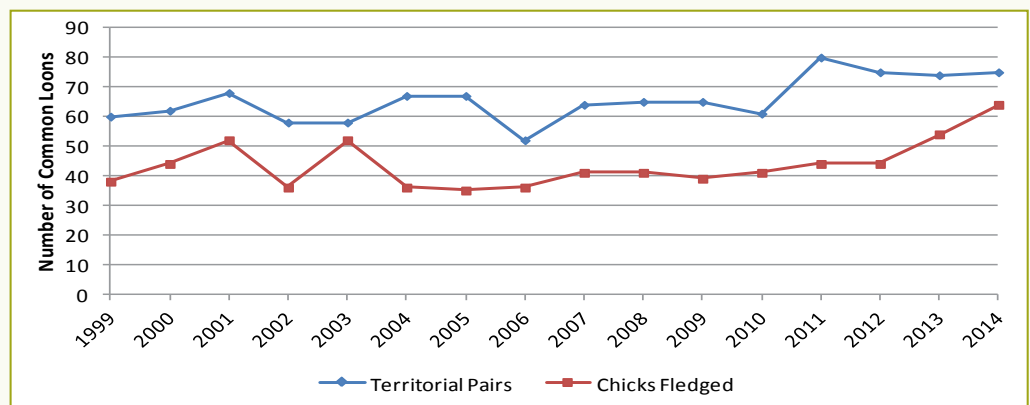


Color banding provides information on interseasonal movements, between-year territory fidelity, mate switching, estimated minimum survival, individual behavior, and loon social dynamics (Evers 2001), and links local breeding populations to key winter habitat. Many of these findings can then be related to productivity. To date, BRI researchers have banded more than 5,000 loons across North America.

**Figure 3a (top).** The number of territorial pairs in Montana has increased by 44% since 2006 and number of chicks fledged ranged from a low of 35 in 2005 and a high of 64 in 2014.

**Figure 3b.** Based on comparisons with national models that indicate 0.48 fledged young per territorial pair (overall productivity) are needed for a sustainable population (Evers 2007; Evers et al. 2010).

Productivity over the past 15 years indicates that the Montana population is sustainable and increasing. In no year did the population drop below the sustainable production level.



## Common Loon Demographics Across North America

Much is known about the demographics of the Common Loon based on a 28-year monitoring program of color-marked individuals from across North America (n>5,000) and associated movement studies using satellite telemetry (n>50 individuals) conducted by BRI researchers.

For example, on average, individual loons produce 5-10 fledged young over a lifetime. This is based on a model using known national rates for fecundity of 0.24 fledged young per female (or 0.48 fledged young per territorial pair), average first year breeding at 6 years of age, 3 year old survivorship of 48 percent, 3-20 year old annual survivorship of 92 percent, and 20-30 year old annual survivorship of 85 percent).

Models developed by BRI in conjunction with the U.S. Environmental Protection Agency and the U.S. Fish and Wildlife Service indicate that a long-term average of 0.48 fledged young per territorial pair is needed for a sustainable loon population. Typically around 18-20 percent of the summer adult population represents individuals that may be over-summering (in Montana the average was 24 percent), but not attempting to breed (i.e., 3-5 year olds).

Common Loons are poor colonizers; adults disperse an average of 1-2 miles from their previous breeding territory and fledged young disperse an average of 12 miles (although the record is just over 100 miles) (Evers et al 2010).

*The Common Loon, prominent and charismatic, is highly valued by the general public.*



Although an aquatic bird, loons can fly long distances to migrate from breeding grounds to wintering grounds. Long-distance migrants need staging areas to rest, replace body reserves, and forage. For interior migrants, adequate staging areas such as large lakes and rivers include abundant prey and relatively clear water (Evers 2007). Satellite tracking will further identify migratory movements and habitat requirements to better inform conservation strategies.

## Using Loons to Monitor Lake Quality

Protection of loon breeding habitat is critical to maintaining the integrity of loon populations and avoiding increased degradation of suitable breeding habitat. Because of the loon's top trophic-level position, high visibility to people, limited dispersal ability, and relatively slow replacement rate, the loon is widely used as an indicator species for tracking aquatic conditions (Evers 2006).

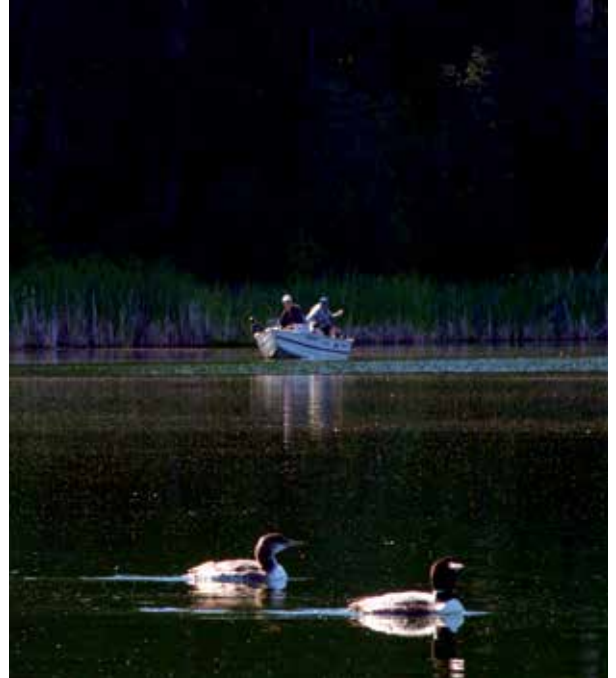
### Human Disturbance Affects Loons

Common Loons are becoming increasingly affected by human disturbance, especially with expanding access to remote lakes. Kelly (1992) showed that loons spend more than twice the amount of time off the nest when the cause of nest flushing is human related (i.e., boats or people walking the shoreline). Kelly's study also showed that flushing distances decreased by 50 percent from 460 feet (140 m) during the first week on the nest to only 230 feet (70 m) during the fourth week on the nest (Kelly 1992). The number of angler visits to a lake can adversely influence chick survival (Paugh 2006).

In addition, high levels of boat-related disturbance can cause formerly occupied territories to be less attractive to potential new pairs. In some instances, wakes from passing boats can erode nesting habitat and flood existing nests.

### Invasive Species Can Pose Problems

We plan to investigate relationships regarding how Common Loons may be affected by exotic species such as purple loosestrife, Eurasian water milfoil, zebra mussels, muskellonge, northern pike, and snapping turtles.



Top: With proper management of resources, loons and humans can share the same lakes. Bottom: Purple loosestrife can result in the alteration of wetland structure and function.

## Montana's Common Loon Working Group

Recognizing the need for collaboration to manage Common Loons in Montana, a team of biologists from both government and nongovernment agencies including the Montana Department of Fish, Wildlife and Parks, the Montana Department of Natural Resources and Conservation, the U.S. Forest Service, Glacier National Park, Plum Creek Timber Company, Avista Corporation, Confederated Salish and Kootenai Tribes, the Montana Loon Society, and private citizens created the Common Loon Working Group. The working group now also includes members of the U.S. Fish and Wildlife Service, the



University of Montana, Biodiversity Research Institute, and lakeshore homeowners, as well as other interested citizens and organizations. Today, this group helps coordinate annual Common Loon monitoring and management activities, conducts capture efforts for banding and tissue sampling (as shown at left), secures funding for research and management programs such as the Loon Ranger program, and compiles annual reports and summaries.

To learn more, visit:  
[fwp.mt.gov/fishAndWildlife/management/commonLoon](http://fwp.mt.gov/fishAndWildlife/management/commonLoon)

# Recommendations from Montana's Conservation Plan for the Common Loon

Evidence of the loon's ability to acclimate to human activities suggests that properly designed conservation efforts can be beneficial in many instances (Evers 2007). Montana's Common Loon Conservation Plan includes the goals outlined below related to monitoring, management, research, and outreach (Hammond 2009, 2011). The purpose of the plan is to maintain a stable Common Loon population by monitoring important demographic parameters within known breeding areas of Montana. The Montana Common Loon Working Group will reevaluate this plan if a population decline is detected over any five-year period.

## Monitoring

Implement effective monitoring programs and strategies through collaboration and coordination with all members of the Montana Common Loon Working Group. Specifically, aim to collect demographic data about the number of territorial pairs, nesting pairs, location of nests, chicks hatched, chicks surviving >6 weeks of age, and number of nonbreeding individuals. We are working with Glacier National Park (GPN) to fund a monitoring initiative in the Blackfeet Indian Reservation. Other high priorities include determination of the status of returning color-banded individuals and the annual capture of individuals to color band, assess health, and measure contaminants. The goal is to maintain a marked population of at least 50 percent of the breeding adults. A critical component of monitoring is to determine the cause of nest failure and chick loss. Findings will be used to assess population stability, colonization ability, and contaminant exposure.

## Management

Maintain the current number and spatial distribution of nesting territories as well as identify and protect quality potential territories that provide suitable nest and nursery sites. Specifics include maintaining an average annual population size of at least 62 territorial pairs with an average annual nest success rate of at least 50 percent when averaged over a five-year period. If the averages fall below 56 pairs or 40 percent, the Common Loon Working Group will assess if average annual fecundity rates are greater than or equal to 0.60 chicks fledged per territorial pair. If the averages fall below 0.48, the Common Loon Working Group will work to minimize

breeding season (April 15 to July 15) disturbance throughout known breeding areas of Montana.

## Research

Develop new research projects as needed and maintain current projects that best guide conservation and management. Such projects include determining survival rates, tracking intra- and inter-seasonal movements for adults and juveniles (using color-marked individuals), developing a capture plan with GNP, and investigating risks from contaminants



Rafts have been proven to be an effective management tool in Common Loon reproductive studies. In New England, rafts increased hatching success by 51% on lakes with stable water levels and 119% on those with fluctuating systems (DeSorbo et al 2007).

in breeding, staging, and wintering areas. Current research includes the compilation of data from multiple states to examine site fidelity across regions.

## Outreach

Provide agencies and the public with the best available science and information related to factors affecting loon breeding success. Maintain and improve communication, coordination, and collaboration, including (1) developing a web-based information center to integrate standardized geo-referenced loon databases and other information into a cooperative system; (2) providing a greater awareness of the needs of loons by using educational and outreach programs, including dioramas, exhibits, and printed and web-oriented communications pieces; and, (3) establishing partnerships between developers, local governments, and conservation organizations to incorporate site-specific low impact uses and loon friendly "Best Management Practices" in shoreline projects.

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## Credits

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BRI's mission is to assess emerging threats to wildlife and ecosystems through collaborative research and to use scientific findings to advance environmental awareness and inform decision makers.

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