

# Common Loons *in the* Classroom



A Teacher's Guide for Grades 3-6

Created by Maine Audubon with support from the Maine Outdoor Heritage Fund and the Margaret E. Burnham Charitable Foundation

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Cover Photo © June LeDuc  
First Place Winner, Judges Panel and People's Choice Award  
2009 Maine Audubon Loon Photo Contest

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## About Maine Audubon

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Maine Audubon works to conserve Maine's wildlife and wildlife habitat by engaging people of all ages in education, conservation and action. Maine Audubon is a private non-profit organization with more than 15,000 members and supporters. Members receive a subscription to the publication *Habitat* and discounts on field trips, workshops, special programs, and merchandise at The Nature Store. Maine Audubon hosts school vacation camps, summer camps, field trips, and adult, family and school programs. For more information, visit [www.maineaudubon.org](http://www.maineaudubon.org) or call 781-2330.



## About the Maine Loon Project

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The primary focus of the Maine Loon Project is the annual Loon Count, which after 25 years, still brings together more than 1,000 volunteers from across the state on the third Saturday of each July. The data from the half-hour morning count generates a loon population estimate for the southern half of the state (south of the 45<sup>th</sup> parallel) for comparison over time. For more details about the current count results, visit [www.maineaudubon.org/loon](http://www.maineaudubon.org/loon).



Other activities of the Maine Loon Project over the last two decades include research and management as well as education and outreach. Activities of The Maine Loon Project are supported by Maine Audubon members, by additional financial gifts made directly to the project, and by project grants. If you would like more information, write or call the Maine Loon Project Director, Maine Audubon, 20 Gilsland Farm Rd., Falmouth, ME 04105, (207) 781-6180, ext. 216 or e-mail [sgallo@maineaudubon.org](mailto:sgallo@maineaudubon.org).

## Acknowledgments

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## **Introduction to Common Loons in the Classroom**

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Maine Audubon created the first *Learn about Loons* curriculum in 1990, and for over a decade there were a dozen “loon kits” circulating among Maine’s elementary schools. *Common Loons in the Classroom* builds upon that earlier curriculum with updated information, resource lists, and new activities in a digital format. This new curriculum is accessible on-line, and though it can easily stand alone, it also has a supplemental box of resource materials (including a stuffed, mounted loon as well as eggs, feathers, bones, photos and complete classroom activity materials) available for loan to classrooms. Visit [www.maineaudubon.org/loonkit](http://www.maineaudubon.org/loonkit) for information about borrowing a supplemental box, or call (207) 781-6180 ext. 216.

It is our hope that many more students in Maine will now be able to learn about loons, their natural history, and their habits, and in turn will become stewards not only for loon conservation, but also for clean water and healthy aquatic ecosystems. Each chapter in this guide highlights a different aspect of the life of common loons, with a summary of relevant biological and natural history background information followed by discussion questions for the classroom, and detailed descriptions of one or more activities for students. Although each chapter focuses on elements specific to common loons, the activities often relate to broader ecological principles.

We hope you find this curriculum an inspiring and exciting addition to your classroom! If you have questions about loons or the classroom activities, or if you wish to provide feedback on how the curriculum worked in your classroom, please visit the curriculum webpage at [www.maineaudubon.org/loonkit](http://www.maineaudubon.org/loonkit). Thank you!

Susan Gallo, Wildlife Biologist and Maine Loon Project Director  
Kara Wooldrik, Director of Education

## Overview For Teachers:

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- Grades:** 3<sup>rd</sup> to 6<sup>th</sup>
- Setting:** Classroom, though activities adaptable for other settings like after-school programs or home-schoolers.
- Group Size:** 20-30 students but adaptable for smaller groups.
- Time:** 30-45 minute blocks of time, with some activities requiring multiple blocks.
- Subject Areas:** Science, English Language Arts, Mathematics (FMI, see Maine Learning Results)
- Curriculum Structure:** Each chapter has a similar format of three sections:
- 1. BACKGROUND INFORMATION:** Aimed at a fourth-grade reading level, use this section for your own information or read to younger students. Photocopies can be handed out to older students. Students may need to use a dictionary for some of the science and ecology terms, depending on their previous experience in this subject area.
  - 2. DISCUSSION QUESTIONS:** Use these questions to stimulate classroom discussions, or hand the questions out to older students to work on answers in small groups. Students may need access to additional resource materials. Suggested materials are included for each section.
  - 3. CLASSROOM ACTIVITY:** The activities are designed to reinforce the information and concepts introduced in the background reading material and explored with the discussion questions. Activities are keyed by grade but can be tweaked for older or younger students. The activities stand alone if there is no time allotted for previous sections, as long as students are familiar with the ecological concepts for each section.
- Feedback:** Teacher feedback about how this curriculum has worked in your classroom is incredibly important to us. Find contact information and a link to a survey form with specific questions at [www.maineaudubon.org/loonkit](http://www.maineaudubon.org/loonkit).

## CHAPTER 1: WHAT IS A COMMON LOON?

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### BACKGROUND INFORMATION

The common loon (*Gavia immer*) is one of five species of loons found around the world, and is the only loon that breeds on Maine's lakes and ponds.



*Adult common loon in breeding plumage © Ben Tripp*

In the summer, common loons have a unique breeding plumage (above), with a striking white breast and belly, and distinctive white spots on their black back and wings. The neck and head are dark greenish or black with an incomplete necklace of white stripes. They have a striking red eye. Males are generally larger than females, but otherwise the sexes look identical.



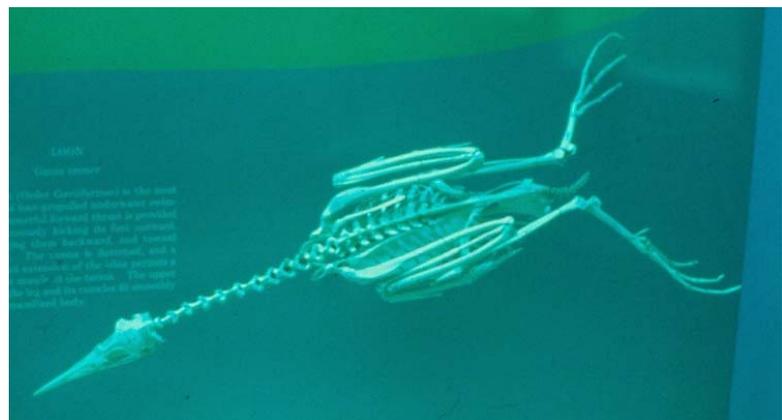
*Adult common loon in winter plumage © Steve Bird*

When common loons molt in the fall, the new feathers are dull grey, brown and white (left). Their eye color also changes to gray. Both of these changes provides loons with excellent camouflage.

Common loons measure about 32 inches from head to tail, and their wingspan is an impressive five feet. They

are one of the heaviest birds in North America, largely because they have solid bones, not hollow like most other birds. The loon skeleton has many other interesting adaptations that help loons survive.

Fossils of a loon-like bird from about 70 million years ago lead ornithologists to mistakenly believe that loons were ancient birds. We now know that modern-day loons evolved around 30 million years ago, which is relatively young for a bird species. The closest relatives to loons are cormorants, vultures, storks and penguins.



*Common Loon Skeleton*

## **CHAPTER 1: WHAT IS A COMMON LOON?**

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### **DISCUSSION QUESTIONS (WITH ANSWERS)**

*Use these questions to spur classroom discussion, or photocopy the [questions \(without answers\)](#) and have students break into small groups to research their answers and present them to the class. Use loon references listed in [Appendices II-IV](#), as well as lake ecology and/or general bird field guides as needed (included in the supplemental box).*

#### **1. What are some other types of loons and where do they live?**

There are four other species of loons in the world. Pacific loons, yellow-billed and red-throated loons breed across northern Canada and Alaska, and on a limited geographic scale across northern Europe and Asia. Arctic loons breed only in western Alaska on this continent but otherwise breed widely across northern Eurasia.

#### **2. Why is the loon's eye red?**

Some scientists have speculated that the red eye might be useful for attracting a mate, since the color is more intense during the breeding season. The red eye might also help decrease reflections underwater so that they are better camouflaged when chasing fish. There is a common misperception that red eyes help loons to see underwater, but this is not true.

#### **3. How does the loon's coloring act as camouflage?**

When aerial predators look down, the loon's dark back blends into the surrounding water. The lighter belly, when viewed from under water, blends in with the light shining down. Called counter-shading, this color pattern is common throughout the animal world, especially in marine environments.

#### **4. Study the loon photos on [page four](#). How is the loon body and skeleton adapted for life in and under water?**

- The neck is long and flexible, allowing loons to chase after fish that are zigzagging to get away under water.
- The long, sturdy and very sharp bill helps loons not only to catch and hold fish but also to defend themselves from other loons who might want to fight them for a territory or mate.
- The large feet, located at the back of the body, provide the power for swimming underwater.

## **CHAPTER 1: WHAT IS A COMMON LOON?**

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- 5. Sometimes adaptations that make an animal efficient in one environment can cause problems in a different kind of environment. How might the location of the legs at the back of the body (an adaptation for swimming) be a problem for a loon?**

Loons have a hard time balancing on land, because their bodies are so heavy and their legs are located at the very back of their body. This makes it very difficult for a loon to walk on land. Since loons build their nests right at the edge of the water, where they can easily slip on and off, they rarely need to walk on land. But when water levels change and they need to navigate on land to their nests, they have a difficult time and are often detected by predators.

- 6. Loons are very heavy birds. How does their weight help (or hurt) them?**

Their weight helps them stay underwater when they dive and swim, but it makes flying more difficult. In order to take off, loons need about a quarter mile of open water as a “runway”. They flap their wings and use their webbed feet to run along the water until they have developed enough speed for flight. Once in flight, loons must keep up their speed to stay in the air. They typically cruise at about 60 miles per hour, but can fly as fast as 90 miles per hour.

## **CHAPTER 1: WHAT IS A COMMON LOON?**

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### **DISCUSSION QUESTIONS (FOR STUDENTS)**

- 1. What are some other types of loons and where do they live?**
- 2. Why is the loon's eye red?**
- 3. How does the loon's coloring act as camouflage?**
- 4. Study the loon photos on page four. How is the loon body and skeleton adapted for life in and under water?**
- 5. Sometimes adaptations that make an animal efficient in one environment can cause problems in a different kind of environment. How might the location of the legs at the back of the body (an adaptation for swimming) be a problem for a loon?**
- 6. Loons are very heavy birds. How does their weight help (or hurt) them?**

## **CHAPTER 1: WHAT IS A COMMON LOON?**

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### **CLASSROOM ACTIVITY: BEAKS AND FEET**

Subject/Topic Area(s):	Adaptations
Time frame:	Two 45-minute class periods
Grade:	3 <sup>rd</sup> – 5 <sup>th</sup> grade
Group Size:	Up to 25

#### **Essential Questions**

- Why do birds have different types of beaks and feet?
- How do their beaks and feet help them survive and thrive in their habitat?
- What unique adaptations do loons have?

#### **Students will be able to:**

- Describe how some birds obtain and eat their food.
- Describe and give an example of an adaptation.

#### **Materials:**

Examples of food types (see below)	Milk cartons
Pipe cleaners	Cardboard
Construction paper	Aluminum cans
Scissors	Plastic containers
Tape	Straws
Glue	Any recycled materials you can find

**Prerequisites:** Students must have an introductory understanding of the concept of adaptation.

**Procedure:** Give each student one item from the food list below and the materials needed to accomplish the following task: each student must create a bird that would be able to catch and eat the particular food they are given. Have the students brainstorm some critical components of the bird such as beak shape, feet type, length of legs, general body shape, wing shape and size, and tail shape and size.

#### **Food List:**

fish	mouse	frog	seeds
plants	snowshoe hare	nectar	fruit
small bird	worm	green crab	insects

#### **Conclusion/ Wrap Up:**

After all the students have completed their birds, have them share their creations with the rest of the class. Have them explain how each adaptation helps the bird find and eat its food. They may then design an imaginary bird that can eat aluminum cans or motor oil!

#### **Assessment:**

- Performance tasks (student products).
- Conversations about why their animal has various adaptations.

## CHAPTER 2: WHERE DO LOONS GO IN WINTER?



Molting Loons © Michelle Lynn

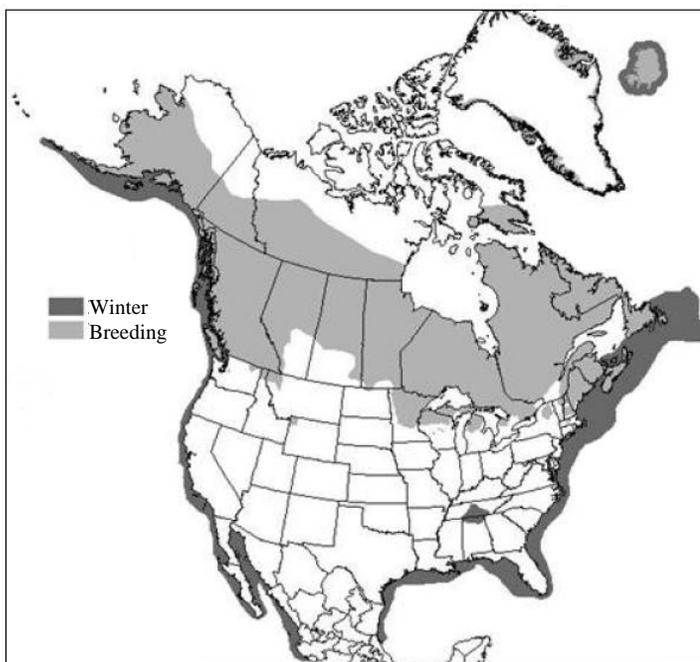
### BACKGROUND INFORMATION

Adult common loons molt in the fall from their dramatic black and white breeding feathers (or plumage) into dull brownish-gray and white winter colors. Juveniles less than six months old do not molt until the spring, when they grow another set of dull gray and white feathers for the following summer. It's not until young loons are almost two years old that they will molt into the dramatic adult breeding plumage so familiar to us on Maine's lakes and ponds.

In the fall, loons get ready to migrate to the ocean where they will spend the winter. The map below shows the winter range of the loon (dark gray) on both coasts and the breeding range (light gray) across Canada and the northern U.S.

After the summer breeding season, adult common loons are social and gather in large groups, or rafts. They hang out together in staging areas on Maine's lakes and ponds to get ready for migration. Juvenile loons raft separately from adults, often later in the fall.

To learn more about migration routes, biologists in New York and New Hampshire caught loons and inserted satellite transmitters under their skin. The tiny transmitters weighed only 18 grams and sent information about the loon's location to satellites, which, in turn, sent the data to a central computer. Scientists then mapped the route the loons followed to get to the ocean, and documented the time it took to get there.



The range of common loons in North America, modified from the USFWS "Status Assessment and Conservation Plan for the common loons (*Gavia immer*)", Dave Evers, 2004.

## CHAPTER 2: WHERE DO LOONS GO IN WINTER?

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Common loon in winter © USGS

These studies documented loons traveling almost 600 miles over a three-day period, and up to 400 miles in a single movement over two days. They also showed that juveniles started to migrate later in the fall than adults, and they took much longer to make their way to the ocean. Both adults and juveniles stopped at lakes, rivers and reservoirs along the migration route.

Another way to track loon movements is by placing bands, like small bracelets, around their legs. The bands can stay on permanently without affecting the loon's movement or flight. The bands may be an aluminum U.S. Fish and Wildlife Service band with a unique number to identify that individual. They may also be colored plastic bands so that observers with binoculars can identify an individual bird. When loons die at sea and their bodies wash up on shore, the bands may be recovered. From these band recoveries, we've learned that Maine's loons stay fairly close to our coast in winter, ranging only as far south as New York's Long Island Sound.

Once loons get to the ocean, they generally stay within sight of shore. They are very social in winter, and will feed together on large schools of fish. They don't often call or vocalize. They spend a lot of time preening their feathers, oiling them to make them waterproof, which keeps them warm in the frigid ocean water. When days start to lengthen and temperatures rise, they will head back to their breeding lakes to meet up with their old mate (or find a new one) and raise a family.



Color-banded and aluminum U.S. Fish and Wildlife Service bands on a common loon.

## **CHAPTER 2: WHERE DO LOONS GO IN WINTER?**

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### **DISCUSSION QUESTIONS (WITH ANSWERS)**

*Use these questions to spur classroom discussion, or photocopy the [questions \(without answers\)](#) and have students break into small groups to research their answers and present them to the class. Use loon references listed in [Appendices II-IV](#), as well as lake ecology and/or general bird field guides as needed (included in the supplemental box).*

#### **1. Why do loons molt their feathers?**

Feathers are like hair or nails on humans. When they are damaged, they cannot heal themselves. Over time, all feathers wear out, losing their ability to insulate and support flight, so they must be replaced.

#### **2. What makes a good staging area?**

Staging areas are where loons gather in the fall before starting their migration. Good staging areas have lots of fish so loons get plenty to eat before their long flights, and they also are quiet places where loons can rest without disturbance.

#### **3. Young loons, or juveniles, wait longer than adults to migrate to the ocean. Why might this be a difficult task for a young loon?**

Fishing may get more difficult as fish move into deeper water for the winter. Sometimes juveniles stay on lakes until they are partially frozen. This can be disastrous if there isn't enough open water left for them to take flight. Loons need about a quarter of a mile of open water to use as a "runway" for flight. If loons are iced in and unable to leave a lake, they may starve, get too cold, or be killed by bald eagles or other predators.

#### **4. Why would a juvenile's first migration route be wandering and slow?**

Loons are less than six months old when they make their first migratory flight. Since they've never flown to the ocean before, they need to learn their way, using visual cues like mountain chains, coastlines, and large rivers. In subsequent years, their migration will be much faster, in shorter, more direct routes.

#### **5. Satellite transmitters for loons weigh only 18 grams. Are there objects in your classroom that weigh 18 grams? Why can't the transmitters be heavier?**

Three quarters weigh a little less than 18 grams. Even though loons are heavy birds, they can't carry much additional weight. Transmitters must be small and light so they don't affect the loon's ability to fly.

## CHAPTER 2: WHERE DO LOONS GO IN WINTER?

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**6. Loons fly impressive distances in only a few days. Using [the maps](#) as references, have students investigate the following questions:**

- What's the distance from their town to the ocean? (*You may need an additional map of Maine so students can locate their towns*)
- Estimate how long it would take you to drive to the ocean, assuming you could drive in a straight line. Make estimates for different types of roads (highways at 65 m.p.h. versus a single land road at 25 m.p.h).
- How fast do you think a loon can fly? How long would it take a loon to fly from your town to the ocean? *Loons cruise at about 60 mph (though at top speed they can fly at 90 mph), so loon travel times are comparable to highway travel.*
- Comparing the [loon range map](#) and the [map of North America](#), what is the longest distance a breeding loon must fly to the ocean? *Pick different starting points in Canada or the U.S. and measure the distance of migration routes.*
- Are there barriers to loon migration in different parts of the country? *Depending on student's knowledge of the western U.S., deserts and mountain ranges may be difficult for migrating birds to navigate. Also, in the east especially, large urban areas may be avoided by migrating loons.*

For comparison so students can relate to the distances loons travel, here are some rough distances and travel times from the Maine border:

60 miles to Boston	1 hour
270 miles to New York City	4 ½ hours
500 miles to Washington, DC	8 ½ hours
1,350 miles to Orlando, FL	22 hours
2,800 miles to California	47 hours

**7. What would happen if there weren't places for loons to stop along their migration route?**

Just like people, loons have to stop to rest and eat as they travel. Large lakes, rivers and reservoirs along the migration route to the ocean provide critical stopover points during migration. These water bodies must have fish for loons to eat, and quiet places for them to rest. Without these critical stopover points, loons would not be able to maintain the energy they need to survive the journey.



## **CHAPTER 2: WHERE DO LOONS GO IN WINTER?**

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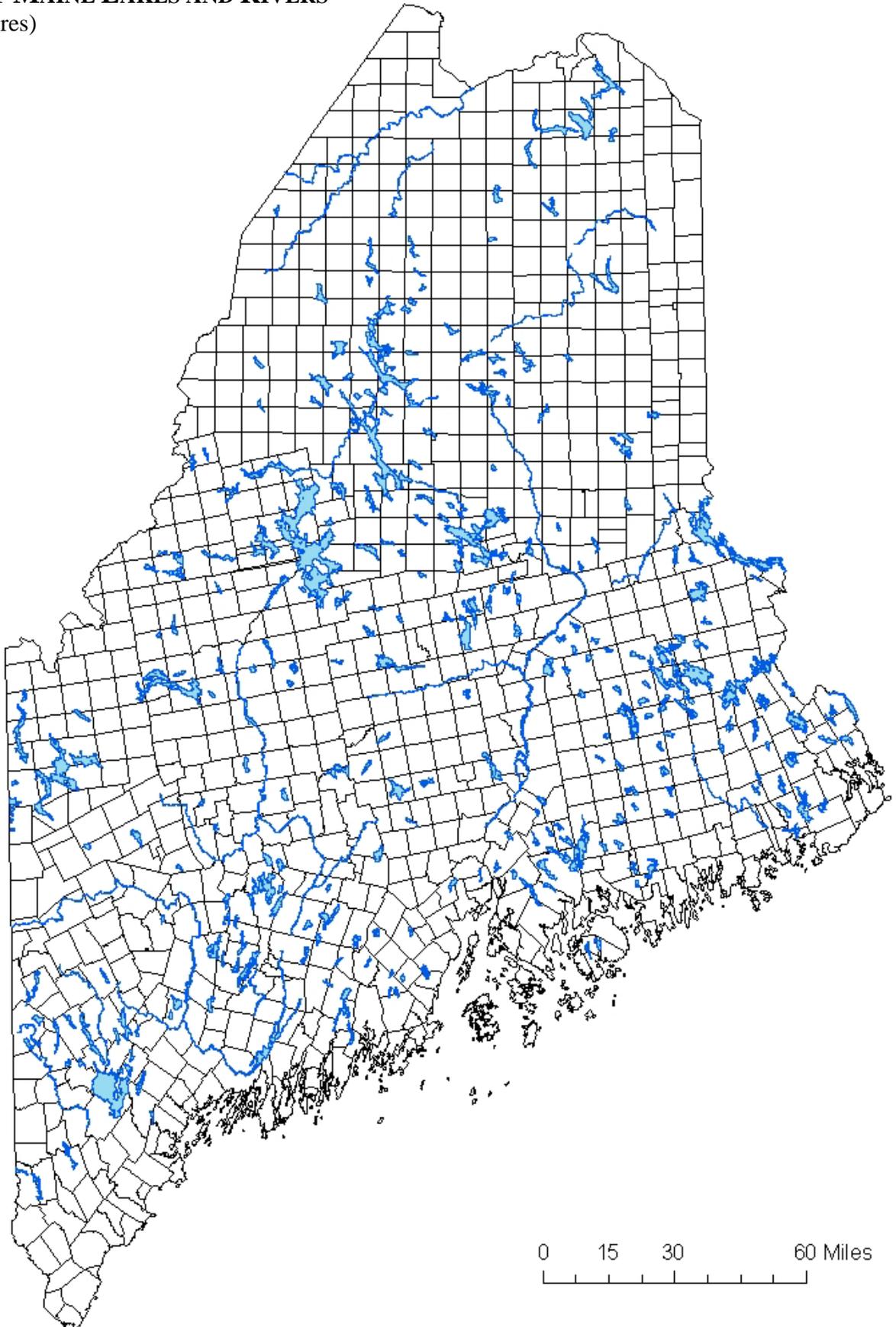
**6. Loons fly impressive distances in only a few days. Using the maps on pages 15-17 as references, investigate the following questions:**

- What's the distance from your town to the ocean?
- Estimate how long it would take you to drive to the ocean, assuming you could drive in a straight line. Make estimates for different types of roads, like highways where the speed limit is 65 miles per hour, or dirt roads where speeds are closer to 25 mph.
- How fast do you think a loon can fly? How long would it take a loon to fly from your town to the ocean?
- Comparing the loon range map and the map of North America, what is the longest distance a breeding loon must fly to the ocean?
- Are there barriers to loon migration in different parts of the country?

**7. What would happen if there weren't places for loons to stop along their migration route?**

## CHAPTER 2: WHERE DO LOONS GO IN WINTER?

### MAP OF MAINE LAKES AND RIVERS (>500 acres)



# CHAPTER 2: WHERE DO LOONS GO IN WINTER?

## MAP OF NORTH AMERICA



**LOON RANGE MAP**



The range of common loons in North America, modified from the USFWS “Status Assessment and Conservation Plan for the common loons (*Gavia immer*)”, D.C. Evers, 2004.

## **CHAPTER 2: WHERE DO LOONS GO IN WINTER?**

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### **CLASSROOM ACTIVITY: MIGRATION CHALLENGES**

Subject/Topic Area(s):	Bird Migration Adaptations
Time frame:	Two 45 minute class periods
Grade:	3 <sup>rd</sup> -6 <sup>th</sup>
Group Size:	Up to 35

#### **Essential Questions**

- Why do loons migrate?
- Where do they go?
- What are the challenges that loons face during migration?

#### **Objectives:**

Upon completion of this lesson students will be able to:

- Correctly name one reason that loons migrate.
- List three challenges that loons face during migration.
- Describe the process of migration and what kind of habitat they need enroute.
- Describe three things that people can do to help loons.

#### **Topics leading up to this activity**

Students should understand the concepts of migration and habitat.

#### **Introduction**

*Why do loons migrate?*

During the breeding season, loons live in lakes throughout the state. They leave their lake homes in the late fall and begin the journey to the ocean, their winter habitat.

Introduce the change in seasons by having half of the class draw a picture of a summer lake and half draw a picture of a winter lake. The students should include a list or drawings of the things that live in the lake. What is different about the two pictures?

Draw two pictures of lake cross-sections on the board. What kinds of food are available in a lake in the summer and fall? Add these to the summer cross-section. Which of these items are available during the winter? Add these to the winter cross-section. Is the food still accessible once the lake freezes? Can a loon survive here? Where can a loon still find fish during the Maine winter?

## **CHAPTER 2: WHERE DO LOONS GO IN WINTER?**

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### **CREATE A LOON TRAVEL PLAN**

*Where do loons go?*

Loons sometimes make their way from freshwater lakes to the ocean by “lake hopping”. If it’s a long way, they will need to stop to feed and rest along the way. Use the [map of Maine](#) to create a possible migration route for a loon. What might make good staging areas? How far could a loon travel in a day? How much longer would it take a loon from northern New York to travel to the ocean compared to a loon from northern Maine?

### **THE INCREDIBLE LOON JOURNEY BOARD GAME**

*What are the challenges faced during loon migration?*

Setting: Classroom with some room to move around.

Group Size: Game should be played in groups of approximately 3-4 students.

#### **Materials:**

Copy of [game board](#) for each group

Set of [migration challenge cards](#) (photocopy and cut)

Game piece for each player

Die for each group

#### **Activity Introduction:**

You have already figured out where loons travel during their annual migration. The trip is not always easy! Let’s brainstorm some of the challenges that a loon may face along their migration route. Make a list on the board.

#### **The Activity**

In this game, the students must imagine that they are a young loon migrating for the first time to the ocean. Divide the class into groups of 3-4 students. Go over the following directions with the students:

#### **Directions for The Incredible Loon Journey**

1. Each person in the group starts by rolling the die. The person with the lowest number goes first.
2. Roll the die and move the game piece number of spaces. Follow the directions given in that space. Pass the die to the next person.
3. If you land on a Migration Challenge card, follow the directions given on the card.
4. If you do not survive, continue to participate by cheering on your game mates.
5. At the end of the game, count how many of your group survived and how many did not.

At the end of the game, ask the students how many loons survived the migration journey. Do you think that the different scenarios happen in real life?

## CHAPTER 2: WHERE DO LOONS GO IN WINTER?

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**Activity Extension:** Turn this game into an obstacle course!

By taking part in a Migration Obstacle Course, students can experience some of the challenges that are included in the board game. A course can be set up using simple materials. Students will start at a lake and end at the ocean. Here are some options for this fun learning activity:

<u>Loon Challenges:</u>	<u>Obstacle Course Activity</u>
Wind Turbine:	Run through a spinning jump rope
Good feeding area:	Playing field with food chips spread out
Poor feeding area:	Marked area with few or no food chips
Staging areas:	Various roped-off areas with food chips
Speedboat or jet ski:	Someone trying to tag the loon
Bad weather:	Crawl or other impediment to flying/running
Power lines:	Limbo stick
Fishing tackle:	Carry books or other object
Pond starting to freeze:	A roped-off area that only has room for one person (loon) to enter at a time
Long runway:	Students must circle one staging area 3 times before moving to the next

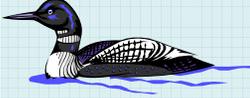
### **Conclusion/Assessment**

At the end of the game, ask the students to list some of the challenges that they faced during the activity. How many of these challenges are human-related? In their small groups, challenge the students to come up with three ways that people can help increase the survival rate of loons.



# The Incredible Loon Journey

Place Migration  
Challenge Cards  
Here

<p><b>Start Here</b> Time to leave your lake home. Roll the die and go that many spaces.</p>	<p>You become tangled in some fishing line.  Lose a turn.</p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Migration Challenge Card</p>		<p>A nor'easter makes it difficult to fly and you freeze to death.  Sorry but you did not survive.</p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Migration Challenge Card</p>	<p>A newly preserved lake gives you a peaceful place to rest and eat.  Roll again.</p>
<p>Watch out for the helicopter! Crouch down for 10 seconds then move 3 spaces.</p>	<p>You have been caught by scientists and banded for research. Go ahead 2 spaces.</p>		<p>A hurricane blows you off course.  Go back 2 spaces</p>	<p>You've landed in a pond full of fish!  Go ahead 2 spaces</p>		<p>You lost an important stopover because the pond froze early.  Go back 2 spaces.</p>
<p>Your lake begins to freeze and you have a hard time taking off. Lose a turn.</p>	<p>A busy lake makes it difficult for you to fish and take off. Lose a turn.</p>		<p>You landed in a pond with a lot of yummy fish.  Take extra turn.</p>	<p>You flew into the large window of a shopping mall. Miss one turn.</p>		<p>You have almost completed your journey!</p>
<p>You rest in a pond with many fish and gain a lot of energy. Go ahead 2 spaces.</p>	<p>One of your resting spots is now a mall. You become tired as you circle for food.  Go back 2 spaces.</p>		<p>Great wind currents help you along your way.  Take the shortcut pass.</p>	<p>A hungry eagle is soaring above you. You must hide.  Go back 2 spaces.</p>		
<p><b>Smooth flying!</b>  Roll again.</p>	<p>Relax and rest in a healthy pond.</p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Migration Challenge Card</p>	<p>You are tired from flying. You must rest before you continue your journey. Skip a turn.</p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Migration Challenge Card</p>		<p>You ate a lead sinker.  Sorry but you did not survive.</p>

**End Here**



## CHAPTER 2: WHERE DO LOONS GO IN WINTER?

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### Migration Challenge Cards

Photocopy and cut out a set for each board game.

Place the cards on the board game square marked "Migration Challenge Cards".

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You have a good  
1/4 mile runway  
for take off.

Flap your wings 30  
times and jump as  
high as you can.

You are tangled in  
some fishing line.

Hop on one foot  
and count to  
twenty.

You encounter an  
early snowstorm  
and can't fly.  
Shiver for 30  
seconds and hold  
your stomach  
because you are  
hungry.

Strong winds  
make it difficult  
to fly.

Flap your wings in  
slow motion 10  
times.

You just ate a  
lead sinker.

Die a dramatic  
death and start  
again from the  
beginning.

Your pond froze  
over in the night.

Stand completely  
still for 30  
seconds.

You have eaten a  
fish from a  
polluted pond.

Hold your stomach  
and groan for 10  
seconds.

A hurricane blows  
you off course and  
you become  
disoriented.

Spin around 8  
times.

You have found a  
pond full of fish.

Smack your lips 10  
times and rub your  
belly.

An eagle is soaring  
above you.

Crouch down and  
remain still for 30  
seconds.

You have landed in  
a wildlife refuge  
with a lake full of  
fish.

Gulp 20 times.

You have flown  
very far and need  
to take a rest.  
Luckily, you have  
found a secluded  
pond. Pretend to  
sleep until your  
next turn.

You have  
encountered  
power lines.

Crouch down and  
crawl around the  
room.

You landed in a  
busy lake and all  
of the boats are  
making you dizzy.

Spin around 10  
times.

You have found a  
secluded lake!  
You are full of  
energy because  
you have eaten a  
lot of fish.

Flap your wings 30  
times.

A resting pond has  
been developed and  
has many boats and  
fishermen. You  
must find another  
place to rest.  
Walk around the  
room and flap your  
wings as you go.

## CHAPTER 3: TIME TO START A FAMILY: TERRITORIES AND NESTING

### BACKGROUND INFORMATION

Male loons usually arrive on Maine's lakes and ponds within a day or two of ice out, the day ice breaks up on a lake. The first thing he will do is establish and defend a territory, an area for nesting and raising chicks that he and his mate will defend from other loons. Loons will defend about 100 acres on average for their territory. They may defend a whole pond, a section of a larger pond, or many small ponds together to make up a territory.



Nesting Loons © June LeDuc



Male loon doing the "penguin dance"  
© John Ronnquist

Loons tend to return to within about 15 miles of where they were raised, and they also tend to return to the same territory year after year. Vacant territories with good opportunities for fishing and a safe place to nest are hard to find, and it can take loons several years of trying before they succeed in getting their own territory. In fact, on average, loons do not breed until they are about seven years old.

An established loon who is challenged on his territory may make loud calls, swim toward the intruder while flapping his wings or display the "penguin dance" (left), where he pulls his chest high out of the water and "runs" upright. Challenges may escalate into physical fights (below) and loons have sometimes used their sharp bill and strong necks to kill their challenger.

Females return to the territory a few days after the males, and mated pairs spend much of their time swimming and feeding together. A loon pair generally stays together for about seven years, until either the male or female is successfully challenged by a newcomer.



Loon battle © George Ely

After spending a few weeks together in the spring, loons will build a nest right at the water's edge. Loons like quiet locations with no wind, often choosing marshy areas, protected coves or islands for their nests. Nests vary from shallow scrapes in the ground to a large bowl of vegetation and mud taken from the lake. Nests can be up to two feet across.

Loons generally lay two eggs between mid-May and mid-June. The eggs are quite large (up to four inches long) and are olive-green to brown in color, often with brown spots.

The adults take turns incubating the eggs to keep them warm on cool days, cool on hot days, and safe from predators. If people get too close to nesting loons, the birds may get off the nest, leaving the eggs vulnerable to both predators and extreme temperatures.



*Adult on nest © Alex Rogers*



*Loon "hangover" position © Marianne Tufts*



*Loon tending eggs © Gail Smith*

Sometimes when nesting loons are disturbed, they will freeze in a "hangover" position by hunching up their back and hanging their head low over the water (left). This gets the loon ready to leave the nest and slip into the water quickly if necessary. It also may help hide the loon in the vegetation.

For years, scientists thought that loon parents shared fairly equally in the duty of incubating their eggs. Recent video footage of nesting loons by remote cameras has shown that males do much of the incubation during the day. Females tend to incubate at night, when the nest may be more at risk from predators. Loons on the nest at night are constantly listening for predators, looking around and staying very alert. It's not an easy job to sit on eggs every night! But with luck, after 29 days, loon parents will be rewarded when the eggs hatch.

## VOCALIZATIONS: HOW LOONS COMMUNICATE

There are four basic calls that adult loons use to communicate with each other, and each one has a different meaning. Double-click the icons to hear sounds files, or find them at [www.maineaudubon.org/loonkit](http://www.maineaudubon.org/loonkit) or on the CD included with the supplemental box for this curriculum.



 *Hoot:* The hoot is a soft short contact call between loons, both adults and chicks. It is not associated with any distress or territorial display, but helps to draw individuals together and offers encouragement to chicks.

 *Wail:* The wail is a long one, two, or three note call, often likened to a wolf howl, used in situations where loons want to locate each other. Parents will wail to their chicks to encourage the chicks to leave the nest, approach the parents when they have food, or emerge from a hiding place. The basic message from a wail is “Where are you?”

 *Yodel:* The yodel begins with three notes that rise slowly and are followed by several wavering phrases. This call is produced exclusively by males, and is used in territorial situations and aggressive encounters with other birds. Males will also yodel if they see a predator nearby or even when they see a float plane overhead. Yodeling males crouch flat to the water with their head and neck extended and the lower bill just over the water. The basic warning message from a yodel is “I am a male loon, I am on my territory, and I am prepared to defend it”. Each male loon makes a unique yodel, which usually stays the same from year to year but may change if a male moves to a new territory.

 *Tremolo:* Often called the “laughing call” of the loon, the tremolo is actually an alarm call in threatening situations, such as when a boat is approaching a chick or a nest too closely. Loons will often make this call when flying over a lake, perhaps as a way of asking for clearance to land. If they hear a yodel in reply, they know to move on! Tremolos are also used at night, and members of a pair will duet using tremolo calls.

In addition to these four adult calls, chicks will make a variety of begging calls (called “peents” or “peeps”) to their parents. Chicks will call when separated from their parents, or if they are begging for food. Sometimes chicks will peck at their parent’s bill at the same time they are calling to signal they are hungry.

## DISCUSSION QUESTIONS (WITH ANSWERS)

Use these questions to spur classroom discussion, or photocopy the [questions \(without answers\)](#) and have students break into small groups to research their answers and present them to the class. Use loon references listed in [Appendices II-IV](#), as well as lake ecology and/or general bird field guides as needed (included in the supplemental box).

- 1. How do loons manage to show up on Maine’s lakes and ponds on the day of or the day after ice out (the day in early spring when the surface ice disappears from a lake)?** *Make a list of ideas students might have.*

Scientists think that loons migrate as far as they can to large, open bodies of water. They then make exploratory flights to smaller lakes, watching them as the ice breaks up so that they will be ready to land on the lake the day of ice-out

- 2. Why rush to be the first loon on a lake? Why not take your time getting to a lake in the spring?**

In Maine, there are more loons than there are territories for them to nest in. So there is a lot of competition for territories with good nest sites. The first loon back to a lake in the spring has the best chance of finding (and defending) a good territory. It’s easier to defend a territory than to take one over from an established loon.

- 3. Why defend a territory? Why not let other loons nest close by?**

Loons need a lot of food to raise a family. It takes almost 1,000 pounds of fish to feed a family of four for a whole summer. By separating themselves into established territories, loon families spread themselves out among the limited resource of fish.

- 4. Loons have different types of territories.**

- **Whole lake territories:** They defend the entire lake and are the only loons nesting there.
- **Partial lake territories:** They share a bigger lake with other loon pairs, each with their own section of lake.
- **Multiple lake territories:** Several smaller lakes make up a loon pair’s territory.

**Would one of these be easier to defend than another? Why? Why would a loon prefer a territory that is easier to defend?**

On average, loons need about 100 acres for their territory. A whole lake territory is the easiest to defend, since it’s clear that any loon that lands on the lake is an intruder. Partial lake territories are a little harder to defend, as loons have to maintain their territory boundaries with their neighbors, who may inch into their territory, and have to spend time checking on visiting loons to see if they are invading the territory. It is hardest for a loon to have a multiple lake territory, as they clearly can’t be on more than one lake at a time, and other loons can use one of “their” lakes when they are not there to defend it.

Defending a territory takes energy and time away from protecting their eggs or chicks. The easier a territory is to defend, the more time and energy a parent loon can devote to successfully raising their chicks.

- 5. Like many animals, loons use their bodies to communicate information about what they are thinking. For example, the “penguin dance” is a warning to intruders to back away, that the loon is willing to fight for its territory. Can you think of other types of animal behavior that might send a message? How do people use body language to convey what they are feeling? Have students display some of these behaviors. (Can others guess what they are feeling).**

Some examples:

- Dogs: bare their teeth and snarl if other dogs/people get too close to their food, bones, etc., as a warning that they may bite.
- Cats: hiss when annoyed/angry, often as a precursor to scratching.
- People: cross arms when they are angry, furrow brows to show confusion or misunderstanding, cry when they are sad, some people get red faces when they are angry.

- 6. Why do loons build their nests right on the water’s edge?**

Because their legs are located so far back on their bodies, loons are “top heavy” and cannot walk easily on land. If their nests are right on shore, they can easily slip on and off, quickly and quietly, without drawing attention to themselves. Extra time and movement getting on and off the nest may attract the attention of passing predators.

- 7. Why are loon eggs colored olive-green or brown, often with brown spots?**

This coloring provides camouflage by blending the eggs into the nest of earth, vegetation and plants.

- 8. What type of predators take loon eggs out of a nest?**

Egg predators include mink, skunk, ravens, eagles and otters.

- 9. If you observe a loon on a nest in the “hangover” position (back hunched up, head hung low over the water), what should you do?**

Because this behavior indicates stress from disturbance, you should back quickly and quietly away from the nest until the loon resumes a resting position with its head up. It is a good idea to use binoculars when observing loons to avoid causing them unneeded stress.

## DISCUSSION QUESTIONS (FOR STUDENTS)

1. **How do loons manage to show up on Maine's lakes and ponds on the day of or the day after ice out (the day in early spring when the surface ice disappears from a lake)?** *Make a list of ideas students might have.*
2. **Why rush to be the first loon on a lake? Why not take your time getting to a lake in the spring?**
3. **Why defend a territory? Why not let other loons nest close by?**
4. **Loons have different types of territories.**
  - **Whole lake territories:** They defend the entire lake and are the only loons nesting there.
  - **Partial lake territories:** They share a bigger lake with other loon pairs, each with their own section of lake.
  - **Multiple lake territories:** Several smaller lakes make up a loon pair's territory.

**Would one of these be easier to defend than another? Why? Why would a loon prefer a territory that is easier to defend?**



## CLASSROOM ACTIVITY: A LOON'S JOURNAL

Subject/Topic Area(s):

Time frame: One or two 45 minute class periods

Grade: 4<sup>th</sup>-6<sup>th</sup>

Group Size: Any

### Essential Questions

- What factors contribute to successful migration?
- What factors contribute to a successful nesting season?

### Objectives:

Upon completion of this lesson students will understand the challenges an animal can face finding and making a home and family.

### Topics leading up to this activity:

Students should understand the concepts of migration and nesting.

**Materials:** Paper and pencil

### Introduction:

You have learned about how loons migrate to their summer homes, how they settle in (and sometimes fight!) on their territories, and how they need to protect their eggs for almost a month. For this activity, pretend you are an adult male loon in Maine in early April. Describe your journey and the process of “settling in” to your home. Don’t forget to include:

1. When you leave the ocean
2. Where you fly and how it feels
3. How you find “your” lake
4. Whether the lake has changed since the fall (More water? Less water? New camps built along the shoreline? Evidence of new predators around (tracks or other signs?))
5. Whether you have to compete for space on “your” lake
6. Your food source
7. Your mate’s arrival
8. Your nesting site (What is special about it? Did you use the same site last year?)

### Conclusion/Assessment:

Students should use descriptive language and address all eight areas.

Have students read some of their sections out loud and ask each other questions about their loon character. Was it easy for him? What was the hardest part of his journey? What was the most interesting part of the season?

As an extension, use photos of loons as models for students to illustrate their story. Emphasize the habitat around their loon, whether in flight or settling into their nesting territory, what is around them?

## CHAPTER 4: TIME TO RAISE A FAMILY: CHICKS ON THE WATER

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### BACKGROUND INFORMATION

Loon eggs typically hatch in Maine from mid-June to mid-July. If a nest fails early in the season, loons may lay another set of eggs. These late eggs may not hatch until mid-August.

Loon chicks generally stay in the nest for less than a day after they hatch. Their parents will call them to the water, and move the family to a nearby nursery area in a quiet bay or along a protected shoreline.



*Newly hatched chicks with their parent © Ben Tripp*



*Mom and baby loon © June LeDuc*

Newly hatched loon chicks are downy black fluffy balls that weigh roughly a quarter of a pound, the same as a stick of butter. They can swim right away, and will try to dive, though they have trouble staying underwater for very long. They'll feed themselves insects and other small water bugs, but will rely on their parents for most of their food. For the first two weeks they'll also spend a lot of time riding on their parent's backs.

Loons are visual predators, and will often put their heads underwater to look around for fish. When they find one, they will dive and swim after it, using their long, flexible neck to follow the fish's path. Loons are very good swimmers, and use their large webbed feet to push them through the water, holding their wings close to their bodies. Loons typically catch and eat fish



*Loon with fish © Ben Tripp*

that are between six and eight inches long, though they sometimes attempt to eat fish that are much bigger. Loon parents will catch very small fish for their young chicks, sometimes injuring the fish and letting it go so that chicks can practice their fishing skills.

By the end of their second week of life, chicks gain about seven times their body weight. That's like a human baby growing to the size of a third grader in just 14 days!



*Parent feeding young © Kerry Woodbury*

Loon chicks are completely dependent on their parents to protect them from predators and bad weather. Even if they stick close to their parents, though, the chance of chicks surviving through their first few weeks is quite low, and in fact, in Maine, chicks have only a 25% chance of surviving the summer.

Feathers start to replace the downy fluff at about five weeks of age, and by eight weeks almost all the adult feathers have grown in. If loon chicks make it to this age, they have a very good chance of surviving to adulthood.

Parents usually stay with their chicks and feed them for about three months. Chicks continue to beg for food from their parents, long after they are big enough to catch fish on their own, generally as long as their parents stick around. That may be why adult loons tend to leave our lakes and ponds in September and October!



*A loon chick at about seven weeks old. © Ben Tripp*

### LOONS AND SIBLING RIVALRY

Just like in human families, loon brothers and sisters don't always get along. The chick that hatches first has a little more time to grow. What starts out as a tiny difference in size quickly turns into a big advantage, as the bigger chick can beg for more food from its parents. Bigger loon siblings have been observed pulling their smaller siblings underwater, taking their food away, and chasing them away from the safety of their parents. If loon parents don't catch enough food for both chicks, the bigger chick will be the only one to survive. However, if something happens to the bigger chick, the smaller chick can quickly recover.



*Two newly hatched chicks © Alex Rogers*

Young loons start to fly at about 11 weeks of age, and are fully capable fliers within a week. At this point, they have also reached full adult size. Even though they can fly, they tend to stay put on the lake where they hatched, filling up on fish and resting until the late fall flight to the ocean.

## CHAPTER 4: TIME TO RAISE A FAMILY: CHICKS ON THE WATER

### DISCUSSION QUESTIONS (WITH ANSWERS)

Use these questions to spur classroom discussion, or photocopy the [questions \(without answers\)](#) and have students break into small groups to research their answers and present them to the class. Use loon references listed in [Appendices II-IV](#), as well as lake ecology and/or general bird field guides as needed (included in the supplemental box).

#### 1. List three reasons why loon chicks ride on their parents' backs?

- They are safe from underwater predators like snapping turtles and big fish.
- They are safe from aerial predators like bald eagles.
- They stay warm, as water temperatures in early summer are still quite chilly.
- They need to stay close to their parents. Chicks can't swim as fast as their parents, so back-riding assures that they won't be left behind.

After about two weeks, chicks are too big to get on their parents backs. Their parents may then tuck their wing around a chick in the water, which will help keep them safe.

#### 2. Say you are a loon biologist studying the feeding habits of common loons. How could you figure out what types of fish or how many fish a loon eats each day?

Some ideas and why they might not work (this also explains why we don't know very much about loon feeding habits!):

- Underwater cameras (loons move around too quickly chasing fish, conditions for capturing images underwater are not good (low light))
- Following loons in scuba gear (we can't swim as fast as a loon)

Some ideas that have worked but are not necessarily very practical:

- Check the gizzard (equivalent to a human stomach) contents of a dead common loon
- Raise chicks by hand and feed them each day, measure amount food offered each day and how much is eaten (need federal permit, time intensive)

#### 3. We know from an experiment with captive loons that adults eat about 2 pounds of fish every day (and remember that loons only weigh between 9 and 15 pounds!) Can you estimate how much a family of four loons would eat over a whole summer?

Students should figure out how long a "loon" summer is (roughly 5.5 months long)

Time of Year	How Many Loons?		How Much Fish?	Total
mid-April through May	2 adults	45 days	2 lbs/day	180 lbs
June	2 adults 2 small chicks	30 days	2 lbs/day 1 lb/day	120 lbs 60 lbs
July	2 adults 2 medium chicks	30 days	2 lbs/day 1.5 lbs/day	120 lbs 90 lbs
August	2 adults 2 large chicks	30 days	2 lbs/day 2 lbs/day	120 lbs 120 lbs
September	2 juveniles (adults have left)	30 days	2 lbs/day	120 lbs

## **CHAPTER 4: TIME TO RAISE A FAMILY: CHICKS ON THE WATER**

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*Note this exercise is to get students thinking about how much fish loons eat. The amounts given for chicks of different ages have not been documented but are estimates that bring the grand total (930 lbs) very close to the total found by experiments with captive loons (935 lbs.)*

### **4. Why would loon parents be unable to catch enough fish for their chicks?**

The “best” territories for loons have plenty of fish habitat (food for fish to eat, and places for fish to rest and hide). Factors that affect the quality of fish habitat will in turn affect the quality of a loon’s territory.

If a loon is late coming to a lake, or he is young and has to establish a new territory for nesting and feeding, his territory may not have good fish habitat, and therefore may simply not have enough fish to feed the loon or its family.

Even if there are lots of fish within a loon’s territory, they need to be the right size for loons to eat (ideally 6-8” long). Bigger fish will be difficult to swallow. Also, some species of fish (like perch) are easier for loons to catch because they swim in a zigzag pattern when they are being chased by a predator. Species like trout that swim away quickly in a straight line are more difficult for loons to catch.

Finally, loons are visual predators and need to see fish in order to catch them. If water is cloudy due to pollutants or run-off (like chemicals from detergents, lawn fertilizers, sand or other fine sediments from roads and driveways), loons will have a harder time catching fish and may not catch the amount of fish they need to feed both themselves and their chicks.

## **CHAPTER 4: TIME TO RAISE A FAMILY: CHICKS ON THE WATER**

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### **DISCUSSION QUESTIONS (FOR STUDENTS)**

- 1. List three reasons why loon chicks ride on their parents' backs?**
  
  
  
  
  
  
  
  
  
  
- 2. Say you are a loon biologist studying the feeding habits of common loons. How could you figure out what types of fish or how many fish a loon eats each day?**
  
  
  
  
  
  
  
  
  
  
- 3. We know from an experiment with captive loons that adults eat about 2 pounds of fish every day (and remember that loons only weigh between 9 and 15 pounds!) Can you *estimate* how much a family of four loons would eat over a whole summer?**
  
  
  
  
  
  
  
  
  
  
- 4. Why would loon parents be unable to catch enough fish for their chicks?**

## **CHAPTER 4: TIME TO RAISE A FAMILY: CHICKS ON THE WATER**

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### **CLASSROOM ACTIVITY: FEEDING FRENZY**

Subject/Topic Area(s):	Predation, Competition, and Sibling Rivalry
Time frame:	45-60 minutes
Grade:	3 <sup>rd</sup> -6 <sup>th</sup> grades
Group Size:	Up to 35

#### **Essential Questions**

- Who are loon predators?
- What are some adaptations that help protect the loon from predators?
- Who competes with the loon in the lake habitat?
- How does competition benefit the loon species?

#### **Objectives:**

Upon completion of this lesson students will be able to:

- List two possible loon predators.
- Identify three adaptations that protect loons from predation.
- Define the term competition.
- State one benefit of competition.
- List three other animals who share loon habitat.

#### **Prerequisites:**

Students should understand these concepts: habitat, predator, prey, adaptation. Students should be familiar with fractions, and might want to review the fraction addition before this activity.

#### **Introduction**

*What is competition? How does competition benefit the loon species? Who else competes for resources with the loon? Who are loon predators?*

During the breeding season, loons live in lakes throughout the northern regions of North America, including the entire state of Maine. They share the lake ecosystem with many animals and compete with some of them for resources (primarily food). Although adult loons have few, if any, animal predators, eggs and chicks provide food for many other animals.

Introduce the lesson by conducting a group brainstorm about things that live in or around a lake. Do all of these things have the same habitat requirements? Do they all live in the exact same part of the lake? What do they eat?

#### **Materials:**

Copies of the [fish playing cards](#), starting with Version I (need 3 cards per student), additional copies helpful for speedier play. Use Version II for additional exploration.

[Competition Activity Datasheet](#)

Chalkboard or whiteboard

Blindfolds

## **CHAPTER 4: TIME TO RAISE A FAMILY: CHICKS ON THE WATER**

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**Activity Set up:** Spread the fish cards (start with Version I) around the floor or table. Have the students remain seated and pass out a data sheet to record the value of their fish throughout the game. Tell the students that your classroom is a lake, and that they are baby loons feeding on fish in that lake. There are three feeding times throughout the day when they will get to pick a card. In order to remain healthy, each loon needs to “catch” (on their cards) a total of two fish. Although the students get three chances to collect fish cards, each fish card has a different value. Some are only worth  $\frac{1}{4}$  of a fish, while others are worth  $\frac{1}{2}$ ,  $\frac{3}{4}$ , one or even two whole fish.

Begin each round (or “day”) by recording the total number of healthy loons on the board. All loons start out as healthy, with a score of four points on their data sheets. Throughout the game, loons add one point to their score every day they are able to catch at least two fish. They subtract a point from their score every day they catch less than two fish. A score of four or more indicates a “healthy” loon. Loons with a score of three are “weak”, with a score of two are “weaker” and a score of one are “weakest”. When a loon hits a score of zero, they have died from starvation. Loons can move back and forth between “weakest” (1) and “healthy” (4+) states, but once they are dead, they are out of the game.

**Day One:** All loons are healthy at the start of the game. During each feeding time, the students get 15 seconds (this time can be altered to suit the classroom setting) to find one fish card. Once they have a card, they can sit down and record the value of their fish card on their data sheet. Repeat this process two more times for a total of three feeding times per “day”. At the end of the day (after three feeding times), the students should add their fractions together. If they’ve caught two or more fish, they can add a point to their score. If they haven’t, they can subtract a point, and they are now “weak”. Collect the fish cards from the students and redistribute around the classroom as needed, depending on how many copies of the cards were distributed in the first place. The more copies of the cards, the fewer times you’ll need to collect and redistribute.

**Day Two:** Using the competition data sheet as a guide, record on the board the number of healthy and weak loons at the start of Day Two. Repeat the entire feeding process. “Weak” loons with a score of three points must now crawl around the room to catch their fish. If, after three feeding times, the weak loons do not collect enough food again, they lose another point and are now classified as “weaker”. They must hop on one foot the following “day”. If weak loons manage to catch two fish, they add a point and are back to a “healthy” status at four points. Healthy loons who catch two fish continue to add a point to their score.

**Day Three and so on:** Start each day by recording the number of healthy and weak loons on the board. Repeat the process, with the following guidelines:

- 4 or more points: Healthy Loons, can walk to pick up cards
- 3 points: Weak Loons, must crawl to pick up cards
- 2 points: Weaker Loons, must hop one one foot to pick up cards
- 1 point: Weakest Loons, must wear a blindfold to pick up cards
- 0 points: Dead Loons, out of the game

Play as many rounds as time and interest allows, ideally at least 10 “days”.

## **CHAPTER 4: TIME TO RAISE A FAMILY: CHICKS ON THE WATER**

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**Conclusion and Debrief.** Discuss as a class what happened to the loon population on the lake.

- How many total fish were there in the lake?
- How many loons survived?
- What percentage of the total survived?
- Can you make a guess, based on your data, about what might happen over longer periods of time (20 days? 30 days?)
- Did competition for resources increase or decrease as there were fewer loons?
- Was it easier to find fish when other loons were weaker or had died?
- Was this a healthy lake for this loon population?

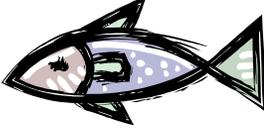
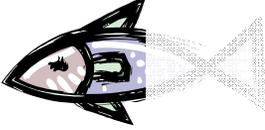
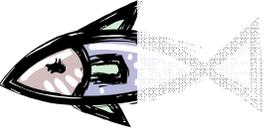
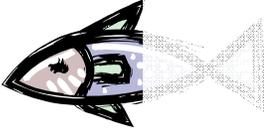
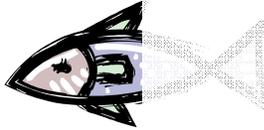
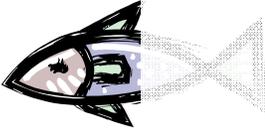
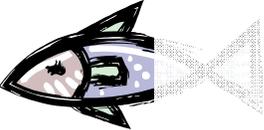
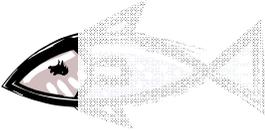
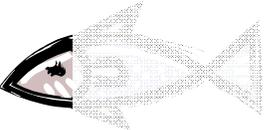
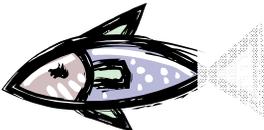
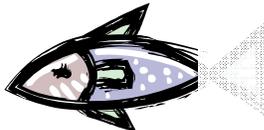
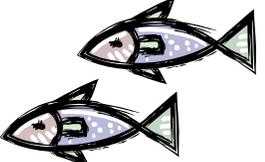
### **Extensions**

The cards in Version I represent a lake with too few fish for a classroom of more than 20 “loons”. Try the card mix in [Version II](#) (shaded gray) for a different experience. This mix of cards has more fish, and will play out with fewer loons “lost” over the course of time. Students can compare the total number of fish in the “lake” to the number of loons in the population and how much food they need to survive. How might this translate to real life situations? How can you ensure there are enough fish to support a healthy loon population (manage fisheries, fish habitat, stock fish in a lake, etc.).

Play the game over more “days” to see what happens. Have the students make their own mix of cards and predict the outcome over time.

We played this game with only loons, but are they the only animals eating fish in this lake? Play again, but this time have some students represent bass, eagles or other animals that compete for resources with loons.

FISH PLAYING CARDS: VERSION I

1 Fish 	1 Fish 	1 Fish 	$\frac{1}{2}$ Fish 
$\frac{1}{2}$ Fish 	$\frac{1}{2}$ Fish 	$\frac{1}{2}$ Fish 	$\frac{1}{2}$ Fish 
$\frac{1}{2}$ Fish 	$\frac{1}{4}$ Fish 	$\frac{1}{4}$ Fish 	$\frac{1}{4}$ Fish 
$\frac{1}{4}$ Fish 	$\frac{1}{4}$ Fish 	$\frac{1}{4}$ Fish 	$\frac{1}{4}$ Fish 
$\frac{3}{4}$ Fish 	$\frac{3}{4}$ Fish 	$\frac{3}{4}$ Fish 	2 Fish 

**CHAPTER 4: TIME TO RAISE A FAMILY: CHICKS ON THE WATER**

**COMPETITION ACTIVITY DATASHEET**

Day	Feeding Times			Total # Fish Caught	If you caught 2 (or more) fish, <b>ADD A POINT.</b> If you caught LESS than two fish, <b>SUBTRACT A POINT.</b>	Score	Status
	Morning	Mid-day	Evening			ADD or SUBTRACT one point.	
						4 points	Healthy
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
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15							

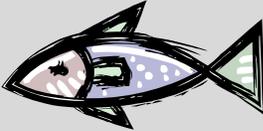
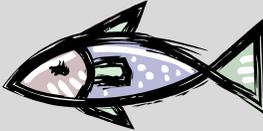
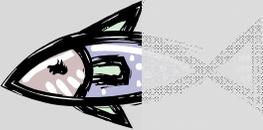
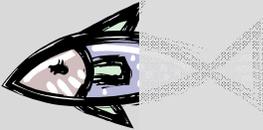
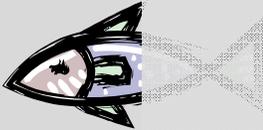
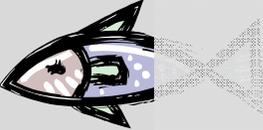
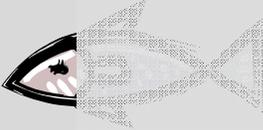
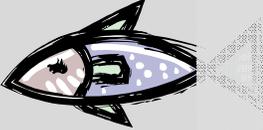
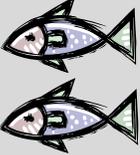
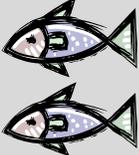
**Point/Status Key:**

Add a point every day you catch >2 fish.

Subtract a point every day you catch <2 fish.

- ≥4 points: HEALTHY**      Walk to catch fish the following day
- 3 points: WEAK**      Fish the next day by crawling on all fours
- 2 points: WEAKER**      Fish the next day by hopping on one foot
- 1 point: WEAKEST**      Fish the next day blindfolded
- 0 points: DEAD**      After at least 4 days without enough to eat, the loon can no longer survive. Player is out of the game.

FISH PLAYING CARDS: VERSION II

1 Fish 	1 Fish 	1 Fish 	1 Fish 
$\frac{1}{2}$ Fish 	$\frac{1}{2}$ Fish 	$\frac{1}{2}$ Fish 	$\frac{1}{2}$ Fish 
$\frac{1}{2}$ Fish 	$\frac{1}{4}$ Fish 	$\frac{1}{4}$ Fish 	$\frac{1}{4}$ Fish 
$\frac{1}{4}$ Fish 	$\frac{1}{4}$ Fish 	$\frac{3}{4}$ Fish 	$\frac{3}{4}$ Fish 
$\frac{3}{4}$ Fish 	$\frac{3}{4}$ Fish 	2 Fish 	2 Fish 

## CHAPTER 5: THREATS TO COMMON LOONS

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### BACKGROUND INFORMATION

Common loons nest in fewer places than they did a hundred or more years ago. In the northeastern U.S., loons no longer nest in Pennsylvania, Connecticut, or Rhode Island. They had disappeared from Massachusetts for most of the last century but since the 1970s have returned to a few of the more remote and undeveloped lakes and reservoirs. There are now over 20 territorial pairs in the state. Even in places like Maine where common loons are still fairly common, they face many threats every year.

**Predators:** Many predators have coexisted with common loons for thousands of years. Bald eagles can catch vulnerable young loon chicks, and can take weakened or sick adults, or adults trapped by ice in early winter. Young chicks are also prey for big fish and snapping turtles, which catch them from below. Minks have been documented rolling eggs out of nests while loon parents are away, and may be one of the biggest egg predators, along with their close cousin, the fisher.



A second group of egg predators are closely associated with humans. These predators may be attracted to lawns, gardens, garbage, and compost. Skunks, raccoons and ravens also prey on eggs, and may be more common in areas where people live.



**Disturbance:** Recreational activities like boating, kayaking, canoeing and water skiing all have the potential to disturb common loons. Loons will leave their nests if boats or people approach too closely, and waves from speeding watercraft can wash the eggs out of nests or separate vulnerable chicks from their parents. Some loons seem to adapt more easily to the presence of people. Other loons, especially those on more remote lakes and ponds, are less tolerant of disturbance and may react to a single distant boater by leaving their nest to yodel and display.

**Fishing Tackle:** Certain types of fishing tackle can be hazardous to loons. Every summer in Maine, loons get tangled in fishing line. Many, like the one pictured here, do not survive.



The ingestion of lead fishing sinkers has been documented as the leading known cause of death for Maine's loons by Tufts School of Veterinary Medicine's Wildlife Clinic.

## CHAPTER 5: THREATS TO COMMON LOONS



A lead sinker in a loon gizzard  
© Tufts Vet School

Birds don't have teeth, so loons must eat small stones and gravel from lake bottoms. This "grit" lodges in the gizzard to grind up food. Loons mistakenly pick up lead sinkers that have been lost on lake bottoms or eat fish with broken fishing line and lead tackle still attached. When these lead sinkers lodge in the gizzard, they release high levels of lead into the loon's body. Lead is a toxic substance, and within a couple weeks, will affect a loon's nervous system, their ability to swim and their ability to catch fish. Lead-poisoning is fatal for loons. The sale of lead sinkers weighing a half-ounce or less has been banned in Maine, though possession and use of lead sinkers remains legal.



The contents of a loon gizzard, including gravel and a lead sinker  
©Tufts Vet School

**Habitat Loss:** Loons need safe places to nest and feed, both during the summer breeding season and during migration. Building homes and camps along shorelines eliminates potential nesting habitat, and disturbance from people using lakes for recreation may keep loons from their nests or from catching fish for themselves or their chicks.

Loons need clean, clear water so they can see and catch the fish they need to eat. Water clarity can be affected by road runoff, pollution, chemicals in detergents or fertilizers, and the uncontrolled growth of non-native invasive plants like Eurasian milfoil that ruin loon and fish habitat.

**Mercury:** Mercury in the environment has the potential to impact entire breeding populations of loons. The bulk of the mercury reaching Maine's lakes travels by air from coal-burning power plants in the Midwest. Once it rains down on Maine's water, some of the mercury is converted by bacteria to a form that is dangerous for wildlife. Mercury travels up the food chain, from invertebrates to fish to loons. Mercury affects how loons behave. Loons with high levels of mercury in their bodies are less likely to sit on their nests or feed their young, so their chicks are less likely to survive. Maine has issued fish-eating advisories for people, suggesting limits on different types of fish due to mercury and other pollutants.

**Oil Spills:** One of the biggest threats to wintering loons is from ocean oil spills, which can be especially devastating if they occur where wintering loons are gathered in large social groups. Oil damages feathers so they are not able to insulate birds against the cold ocean water. Birds with oiled feathers cannot fly or dive. Recent oil spills off the coast of Massachusetts and Rhode Island have killed hundreds of loons and other waterbirds, and damaged their critical winter habitat.

## CHAPTER 5: THREATS TO COMMON LOONS

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### DISCUSSION QUESTIONS (WITH ANSWERS)

Use these questions to spur classroom discussion, or photocopy the [questions \(without answers\)](#) and have students break into small groups to research their answers and present them to the class. Use loon references listed in [Appendices II-IV](#), as well as lake ecology and/or general bird field guides as needed (included in the supplemental box).

#### 1. Why have loons disappeared from the southern part of their range?

In the late 1800s and early 1900s, birds like common loons were shot for sport, for their feathers and purely for “fun”. Luckily, the Migratory Bird Treaty Act of 1920 ended this kind of senseless shooting, but not before many bird populations were either reduced to critically low numbers or had disappeared from parts of their range.

In more recent decades, people have built homes and camps on lakeshores, eliminating loons’ nesting habitat. Suburban development in the areas around lakes has also likely made these areas less appealing to loons.

#### 2. Why have loons returned to Massachusetts?

Since loons tend to return to breed on or near to the lake where they hatched, it can be difficult for them to return to an area once they’ve been “extirpated” (become locally extinct). In Massachusetts, they have returned to Quabbin Reservoir and three other nearby lakes that have little or no development or recreational activity. It probably took loons many years to rediscover this suitable habitat because it is far from where they are currently nesting in New Hampshire, Maine and Vermont.

#### 3. Why are some animals attracted to the places where we live? Is this a problem for loons or other wildlife?

- Lawns and Gardens: good habitat for grubs, beetles and other insects as well as good source of nutritious vegetables and flowers.
- Garbage: easy food source if accessible to wildlife
- Bird feeders: seed spilled on the ground is a good food source
- Pet food: if left outside, a very nutritious source of food
- Decks and garages: provide shelter, sometimes with little human disturbance

All of these features may increase the numbers of wild animals living around or visiting a home. If these animals are predators, and if there are too many of them, they may search for other food sources, like a loon nest along a lakeshore or a bird’s nest in a tree or on the ground, which might have otherwise survived. Too many predators attracted to an area is not good for prey!

#### 4. How could you reduce or minimize the threats to common loons? How could you share information about loon threats with others?

**Predators:** If you have a home on a lake, make it “unfriendly” to loon egg predators. Be sure garbage and pet food are inaccessible. Avoid feeding birds during the spring when seed might attract hungry predators. Keep gardens fenced to keep away skunks or raccoons.

## **CHAPTER 5: THREATS TO COMMON LOONS**

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**Disturbance:** Stay away from loons, especially if they are sitting on their nest or if they act agitated when you are nearby (vocalizing, splashing, etc.). Watch them with binoculars. Be aware of nest sites if you are canoeing or kayaking quietly in marshy areas. If you are in a motor boat, observe the “no wake zone” that is required within 200 feet of shore so that loon eggs aren’t washed out of their nests.

**Fishing Tackle:** Keep stray pieces of fishing line in the boat and out of the water. Use alternatives to lead sinkers (tin, steel, bismuth or ceramic), and retrieve snagged fishing tackle.

**Habitat Protection:** Support local conservation groups that work to protect loon habitat and lake quality.

- Local land trusts often work to acquire and protect lakeshore habitat. You can find a list of Maine land trusts at the Maine Land Trust Network web site ([www.mltn.org](http://www.mltn.org)) and either donate money or volunteer your time on a trail or education project.
- Groups like Maine Audubon have loon education brochures and pamphlets available for distribution. Distribute these to people who boat or fish on Maine lakes.
- Volunteer to help monitor water quality with the Volunteer Lakes Monitoring Program ([www.vlmp.org](http://www.vlmp.org)) or to count loons on Maine’s lakes in the summer for Maine Audubon’s annual loon count ([www.maineaudubon.org](http://www.maineaudubon.org)).
- Contact the Maine Congress of Lake Associations ([www.mecola.org](http://www.mecola.org)) to find a local lake association that might have volunteer opportunities or opportunities for lobbying your legislators on bills to protect water quality and lake habitat.

**Mercury:** Advocate for clean air and clean energy in both the Maine legislature and in Washington DC. Talk with your state and federal senators and representatives, or send them a letter letting them know that you are concerned about the effects of mercury on the people and wildlife of Maine.

The state of Maine posts fish-eating advisories, with suggestions of types of fish to avoid eating due to their high mercury content. Help spread the word about these advisories to angling groups and other lake users. For more information, visit <http://www.maine.gov/dhhs/eohp/fish> and download “The Maine Family Fish Guide”. Use this information to inform others in your community about how they can choose to eat fish that are low in mercury.



## **CHAPTER 5: THREATS TO COMMON LOONS**

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### **CLASSROOM ACTIVITY: LOON LAKE TOWN MEETING**

*Inspired by [Project Aquatic Wild's](#) "To Dam or Not To Dam"*

Subject/Topic Area(s):	Lake Ecology, Wildlife Habitat, Community Government
Time frame:	2-3 hours for prep time and role playing.
Grade:	4 <sup>th</sup> - 6 <sup>th</sup> Grade
Group Size:	24 character cards included, but more can be created. Some cards can be assigned to multiple students, or you may want some students on the "council".

#### **Essential Questions**

- Why are lakes important?
- Who depends on lake habitat?
- How do decisions involving lake habitats affect wildlife and people?

#### **Objectives:**

Upon completion of this lesson students will be able to:

- List three reasons to preserve the natural lake habitat and three benefits to developing the area.
- List at least three reasons why their character supports or doesn't support the lake development.
- List five people/species that would be affected by lake development.

#### **Topics leading up to this activity**

Students should understand these concepts: habitat, conservation, ecosystem

#### **Materials:**

Podium or table in front of the room

Two long tables and chair for each person

[Character cards](#)

Photocopies of [Loon Lake Map](#) and [Development Plans](#)

#### **Room Set Up**

Set up the room with a table or podium in the front as a place for students to speak during the town meeting. Divide the other tables into two sides, pros and cons.

#### **Introduction:**

Decisions about how people can use their land and how to protect natural resources like clean water, clean air, and wildlife can be difficult. Maine's many lake ecosystems provide habitat for animals and plants, recreational opportunities for people, and valuable resources such as drinking water. At the same time, people can buy or build camps along lakes that may affect some of these valuable resources.

Begin the activity by facilitating two brainstorms: "Ways that People Depend on Lakes", and "Ways that Animals and Plants Depend on Lakes." Include recreational activities as well as

## **CHAPTER 5: THREATS TO COMMON LOONS**

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human and animal needs and habitats. Use the brainstorm to get the students thinking about how people's actions affect the lake habitat. How do the things listed interact with each other?

**The Town Meeting:** Present the students with the two maps of Loon Lake (one with and one without the development). Read them the following information:

A pristine lake speckled with islands, Loon Lake is located on the outskirts of town and belongs to the town. Currently there is a hiking trail around the lake and a few primitive campsites along the edge. The lake is surrounded by forest and can be reached by a dirt road. There is a pull-off for a few cars near the trailhead. Scientists who have been monitoring the lake know that there are two existing loon nesting sites on the lake. The lake is potentially large enough for other loons to nest in the area. Many animals and plants reside in the lake.

There is a proposal for a new camping resort called Loon Lake Getaways. The resort includes a campground with 45 sites, flush toilets and showers. The campground proposal also includes seven backcountry sites scattered around the lake. The development also includes a kayak school, 10 primitive cabins, a 20-car parking lot with a boat ramp for lake access, and a nature center at the trailhead. The narrow dirt road will be widened and paved to accommodate more cars and trucks. Many people approve of the new development, but many do not think it is a good idea for the area. Keep in mind, factories in your town that employed many people have recently closed. The developer is willing to pay the town a lot of money for the land. Tourists who visit the resort will also spend money in the town on things like gas and food, which brings money into your community.

You all are going to attend a town meeting to discuss and vote on whether or not the resort should be built on Loon Lake. Each student plays the role of a character that either approves or disapproves of the development. You each will be given a card that defines your character. During the meeting, you will stand before the mayor (the teacher) and/or a "town council" to present your arguments for or against the development. The town council can be made up of students, parents, teachers or principals.

**Procedure:** Give each student a card with a character. Tell the students that it is important for them to remain in character, even though they may not agree with their position. Break the entire group into pros and cons, and have the students take some time to prepare their character. Do not rush through this part of the process - the more time that the students have to prepare, the better the town meeting will be. Students should write down their arguments and take notes to use while at the podium. Prep time can occur in the classroom or could be part of a homework assignment.

Once the students have prepared their arguments, tell them that they will go before the mayor or town council to debate the development of Loon Island Getaways. Have the students sit in their pro and con groups. Make the meeting seem authentic by ordering "Quiet!" and announcing, "The council will hear arguments on Appeal #342 Loon Island Getaways", or "The council will hear arguments for and against the development", and motion for a vote at the end of the debate. Organize the debate in whatever way works best for your class. One option is to have the pro and con students take turns at the podium. At the end of the arguments, the council may want to debate what they have heard, or ask for ideas from the students for ways to improve the

## **CHAPTER 5: THREATS TO COMMON LOONS**

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development and balance the issues that they've raised. The entire group could also vote to approve or deny the development.

**Some specific loon, wildlife, and environmental issues that might arise during the arguments, or which the "council" might want to ask about:**

### **Water Quality:**

- Cabins built too close to a lake will lower water quality (for example, fine sand or silt will be more likely to run into the water and will reduce how clear the water is (sedimentation)).
- Paved surfaces like parking lots cause water to run directly into the lake (rather than filtering through the ground), bringing along salt, oil, gas, and other pollutants from vehicles.
- The boat ramp will be built in a wetland. Lake wetlands are usually shallow, with dense vegetation like rushes and reeds. Heavy motor boat traffic will churn up the bottom, killing the plants and increasing sedimentation (amount of fine sand and sediments suspended in the water).
- The Bath House and Flush Toilets are located relatively close to the edge of the lake, and may contaminate lake water with soap and sewage.

### **Wildlife:**

- More people mean more disturbance to wildlife, on the trails and on the islands. Too much disturbance means wildlife may not be able to feed, rest and reproduce.
- Cabins built on "Loon Island, a documented loon nesting island, may cause loons to abandon this site because of the human activity. Loons prefer remote sites.

### **Recreational Opportunities:**

- Although there will be more opportunities for recreation, some existing opportunities will be lost.
- Additional educational opportunities at the Nature Center and Kayak School
- Improved access to trail head means more people on the trail at any given time.

### **Assessment/Conclusion**

Conclude the activity with a discussion about the whole process. Some appropriate questions:

- What do towns have to consider when a proposal such as this development comes up?
- Is it only people who are affected by the development of a natural area?
- How does shoreline development affect water quality?
- Discuss ways the resort could modify its plans to change its impact on wildlife. Some ideas include:
  - Limiting trail and/or boat use to times of the year when wildlife are less active
  - Limiting use of the loon nesting island, especially in late May and June, the most critical nesting time

## **CHAPTER 5: THREATS TO COMMON LOONS**

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- Moving structures to areas that have less of an impact to natural resources (for example, move the boat ramp to a more suitable, deeper part of the lake)
- Limit the number of parking spaces at the boat ramp (which in turn limits how many boats can go on the water at once)
- 
- Post signs to alert people of wildlife in and around the lake and to ask them to stay away.
- Discuss any current events in your town that pertain to lake and water quality and/or development.

**CHARACTER CARDS**

<p style="text-align: center;"><b>Cy Intist</b></p> <p>You are a local wildlife biologist who studies the many plants and animals that live on and around Loon Lake. You feel that this ecosystem is critical habitat for many species including the loon. For the past 5 years, you have been monitoring the two existing loon nest sites on the lake's islands. If the lake is developed, you believe that the increase in traffic will drive the loons away. Campgrounds also attract loon predators to the area like raccoons.</p>	<p style="text-align: center;"><b>Big Baldy</b></p> <p>You are a beautiful, regal Bald Eagle. You nest on the shore of Loon Lake and catch fish in its pristine waters. If Loon Island Getaways is built, you can still nest near the lake in some remaining large white pines, but you are worried that there will be too much disturbance, and that the water may become polluted which would affect the fish you eat.</p>
<p style="text-align: center;"><b>Beava Trappa</b></p> <p>You are a trapper who sets beaver traps near Loon Lake. With the new camping resort, you would not be able to set your traps there anymore.</p>	<p style="text-align: center;"><b>Tee D. Off</b></p> <p>You are the owner of a nearby golf course and country club. If this resort is built, you will gain a lot of business.</p>
<p style="text-align: center;"><b>Ready Fox</b></p> <p>You are a red fox. You were born near the banks of Loon Lake and love to hunt for mice and grasshoppers in the woods. You plan on raising kits in this beautiful environment. If Loon Island Getaways is built you will no longer have a home, but you might still visit the area for food.</p>	<p style="text-align: center;"><b>Local School Students</b></p> <p>You and your class have spent the year studying aquatic habitats. You spent a lot of time at Loon Lake studying the lake and forest species. You believe that the island should be protected so that other kids can have the same opportunity.</p>
<p style="text-align: center;"><b>Anna Floatin</b></p> <p>You own a local canoe and kayak company in town. Although you can provide rental boats to the many new tourists, you are worried that many motor boats on the lake will make kayaking less appealing.</p>	<p style="text-align: center;"><b>Friends of Loon Lake Association</b></p> <p>You are a group of concerned citizens. You have all lived near Loon Lake for many years. If the resort is built, your roads will have much more traffic. Some of your members think that the money will be helpful for the town, but many are concerned that the resort will ruin the character of the region.</p>

<p style="text-align: center;"><b>Sal Mon Fish</b></p> <p>You are a recreational fisherman who has been fishing for landlocked salmon at Loon Lake for the last 50 years. You are even the president of “Loon Lake Fishermen”, a local fishing club which teaches local kids how to fish. Every year you hold a fishing derby on the lake. The whole town comes out every year for the festivities. If the resort is built, there will be more fishermen on the lake and more competition for fish. You are pleased that you will be able to get your boat into the lake, but are concerned about overfishing.</p>	<p style="text-align: center;"><b>Nate R. Lover</b></p> <p>You are the director of a Nature Camp. You always take your campers to Loon Lake to camp during the summer. It is a camp tradition and an excellent learning experience that may no longer take place if the resort gets built.</p>
<p style="text-align: center;"><b>Seda Jobs</b></p> <p>You believe that all of the new tourists will spend lots of money at shops and restaurants in your town. This construction project will also bring lots of new jobs to the area. You think that this will greatly benefit the local economy.</p>	<p style="text-align: center;"><b>Bo T Sailer</b></p> <p>Your out-of-state boating company will be a part of the resort. They will hire you to take tourists out on an educational lake cruises. You will make more money than you do catching fish.</p>
<p style="text-align: center;"><b>Hammer N. Nails</b></p> <p>You are the representative for Woods N Hills Construction Company. If this proposal passes and your company is chosen to build the new resort, you will make lots of money. Because your company only employs local people, a lot of this money will stay in town (through taxes and shopping). This would be very good for the local community.</p>	<p style="text-align: center;"><b>Luvta Camp</b></p> <p>You are the future manager of Loon Island Getaways. Your job would be to create a family-friendly camping resort where families will participate in an outdoor adventure together. The natural beauty of Loon Lake will be a perfect backdrop for this amazing resort.</p>
<p style="text-align: center;"><b>Sam Salmon</b></p> <p>You are a landlocked salmon who lives in Loon Lake. You like the peaceful environment and are concerned about overcrowding.</p>	<p style="text-align: center;"><b>Lou Loon</b></p> <p>You are a loon who nests every year on Little Loon Island. The traffic from a new camping resort will drive you away from this nesting site.</p>

<p style="text-align: center;"><b>Ima Paddler</b></p> <p>You will be the head instructor at the new kayak school at Loon Island Getaways. You are excited to help people discover the beauty of Maine’s lake ecosystems. If the resort is built, not only will you have a great job, you will teach people to love a great and healthy new sport.</p>	<p style="text-align: center;"><b>Nat Ural</b></p> <p>You are a local naturalist who will become director of the new Loon Lake Nature Center. You are excited to have the opportunity to teach campers and other visitors about the beautiful lake environment.</p>
<p style="text-align: center;"><b>Rocky Raccoon</b></p> <p>You live near Loon Lake. The new campground will bring lots of people who do not clean up their campsites properly. You will be able to find lots of new food!</p>	<p style="text-align: center;"><b>Joan Leader</b></p> <p>You are a Certified Maine Guide who leads fishing and hunting trips in the region. You make a lot of money taking people on backcountry fishing trips at Loon Lake.</p>
<p style="text-align: center;"><b>Bonnie Backpacker</b></p> <p>You love camping and hiking. Loon Lake is currently one of your favorite spots for backcountry camping because of its quiet, pristine environment. You do not want to lose one of your favorite camping spots.</p>	<p style="text-align: center;"><b>Forest R. McGee</b></p> <p>You are a local forester who cuts and processes local timber. You will be providing the timber for the construction of Loon Island Getaways.</p>
<p style="text-align: center;"><b>Philip Flapjack</b></p> <p>You own the local town diner. You know that the town needs more money, but realize that many people are attracted to the area’s beautiful lakes and secluded atmosphere.</p>	<p style="text-align: center;"><b>Bertha Birdwatcher</b></p> <p>You are an avid birdwatcher who lives near Loon Lake. You believe that the lake should be preserved for the sake of its wildlife. You know that many birds utilize the lake during migration season.</p>

LOON LAKE MAP

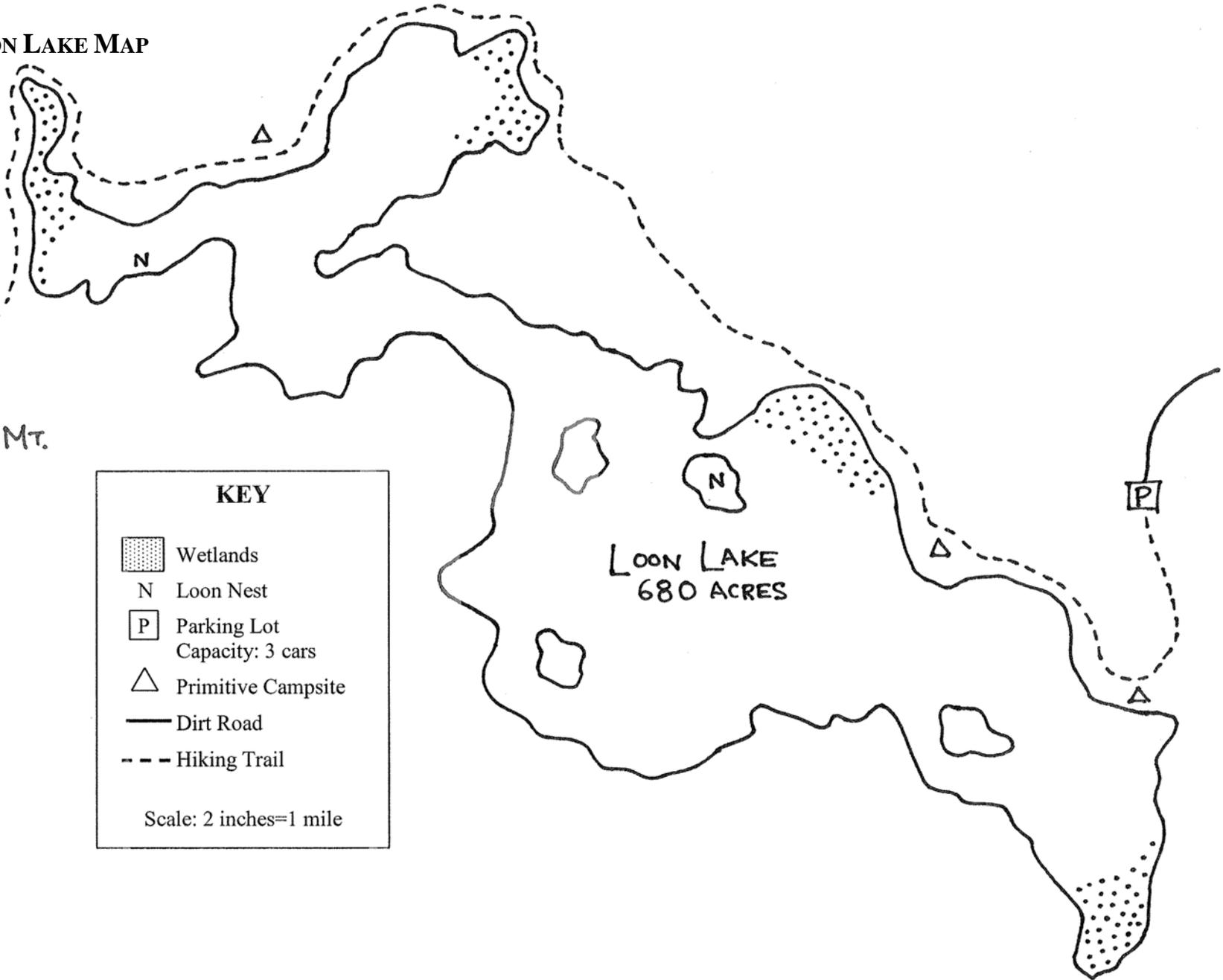
54

LOON MT.

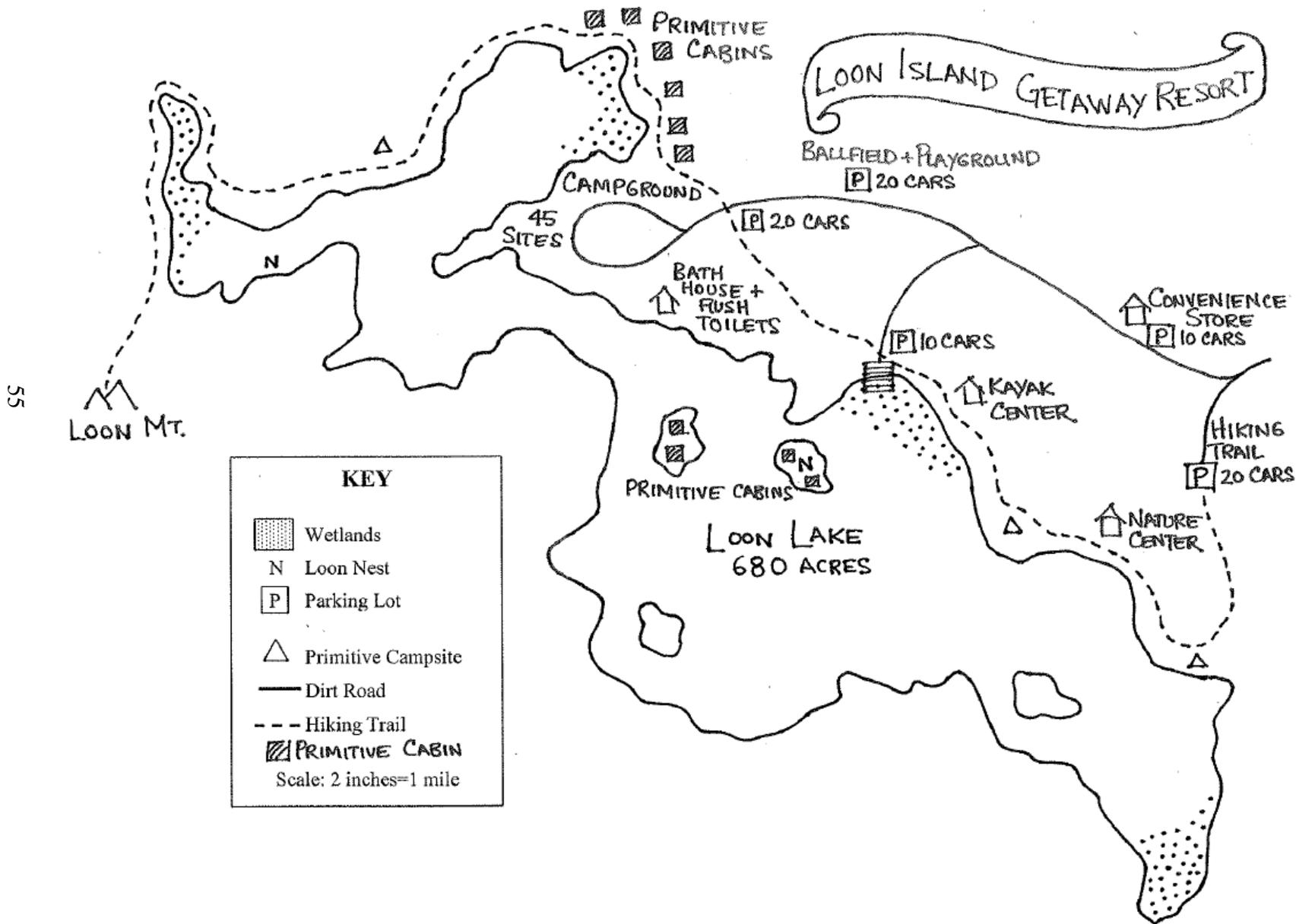
**KEY**

-  Wetlands
- N Loon Nest
-  Parking Lot  
Capacity: 3 cars
-  Primitive Campsite
-  Dirt Road
-  Hiking Trail

Scale: 2 inches=1 mile



# DEVELOPMENT PLANS



## CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH

### BACKGROUND INFORMATION

There are many ways to manage threats to common loons, and to investigate loon biology and behavior. By improving the quality of habitat and changing our own behaviors, we can make a real difference for common loons nesting in Maine.



*Loon parent with chick © Jason Parrot*

**Outreach and Education:** One of the best things we can do for loons is to share our knowledge about the threats they face with other people. The more people know about where loons live and what they need to survive, the more they can act to change their behavior and improve loon habitat. Organizations like Maine Audubon ([www.maineaudubon.org](http://www.maineaudubon.org)) and BioDiversity Research Institute ([www.briloon.org](http://www.briloon.org)) have educational programs for both adults and kids about loon conservation.



**Artificial Nesting Platforms:** On lakes where dams frequently change water levels, floating platforms for loon nests can be a good alternative to natural nesting sites. The floating nests move up and down as water levels change, and may also be safer from some predators.

The platforms are usually made out of cedar logs, and covered with snow fencing or other material to hold vegetation and muck. The platforms are then anchored to the lake bottom in a sheltered cove. It may take loons up to three years before they use a floating platform, and sometimes they won't use one at all. The location of the platform might not be right, or if the loons are successful on their nests in a "natural" setting, they may not want to change.

**Capture and Banding Programs:** Researchers at BioDiversity Research Institute developed a safe method for capturing loons in the mid-1990s. They went out in a boat at night, and played a tape of a loon call. When adult loons heard this "strange" bird on their lake, they came closer to investigate, especially in the early summer when they had chicks. Researchers then shone a bright light in their eyes, making the loons "freeze" on



*Banded Loon © Nina Schoch*

## CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH

the water until the researchers got close enough to dip a large fishing net under the bird and pull it gently and safely into the boat. Once on the boat, researchers took blood and feather samples, and put color bands on the loons' legs so they could be identified from afar in coming years (see Chapter One). By developing this safe and efficient capture method, biologists were able to color band enough loons that they could start to track which loons were on which lakes.



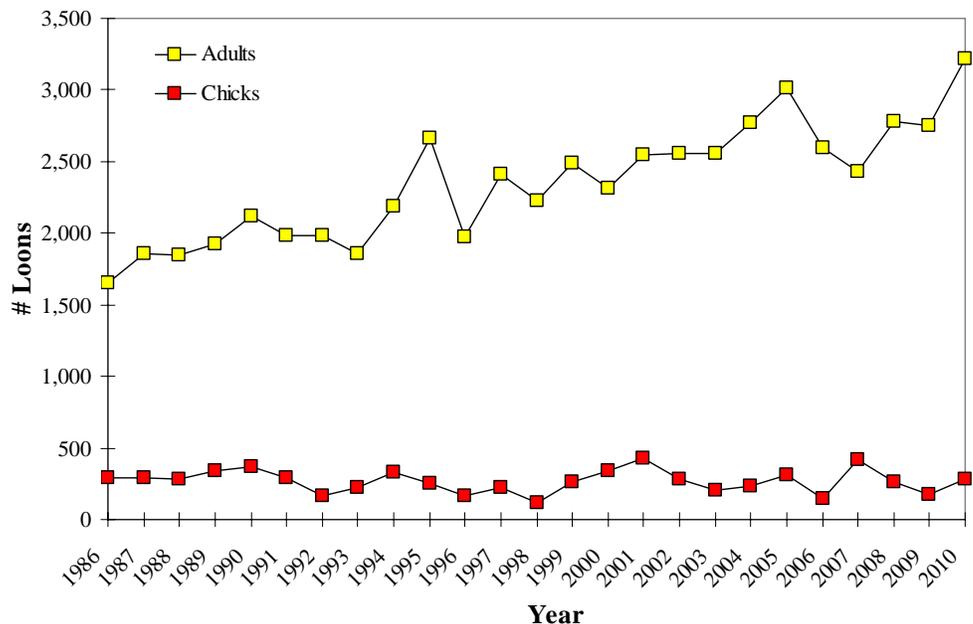
*Loon Cam photo at night*  
© BioDiversity Research Institute

**“Loon Cam”:** Scientists learn about animals by watching their behavior, how they act in different situations and what they do over long periods of time. Watching loons can be difficult. They can fly away, of course, or dive underwater and then surface many hundreds of feet away. Their nest site may be well camouflaged, or hard to observe without disturbing the nesting pair. One solution that allows scientists to gather lots of information about loon behavior without disturbing them on the nest is to set up a live video camera.

Scientists at BioDiversity Research Institute have done just that. For the last 10 years, they have set up a video camera before the nesting season at a

known nest location, then waited for the loons to come back to nest. When the loons return, the camera is on all day (and all night), and researchers (and you!) can watch them on the internet. Each year researchers have gathered hundreds of hours of video, and by analyzing the footage, they have discovered many interesting things about loon behavior. Check out the camera at [www.briloon.org](http://www.briloon.org).

**Maine Audubon Loon Count:** Over 800 volunteer “citizen scientists” head out between 7:00 and 7:30 a.m. on the third Saturday of each July to count adult loons and chicks on more than 300 lakes and ponds across the state. A sample of loon count data is then used to estimate the loon population in the southern half of the state (south of the 45<sup>th</sup>



*Loon Population Estimate for Southern Half of Maine*

parallel, roughly from Calais in the east to Rangeley in the west), which can then be compared to previous years (see the chart at left). The adult loon population has grown slowly but steadily over the past two decades, though the chick population has remained about the same, fluctuating up and down every three or four years.

## CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH

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### DISCUSSION QUESTIONS (WITH ANSWERS)

Use these questions to spur classroom discussion, or photocopy the [questions \(without answers\)](#) and have students break into small groups to research their answers and present them to the class. Use loon references listed in [Appendices II-IV](#), as well as lake ecology and/or general bird field guides as needed (included in the supplemental box).

- 1. Look at the graph on page 56, which documents the loon population estimate for the last 20 years. Are there unusual data points in the graph? Brainstorm a list of four or five reasons that might explain variation in the survey results from year to year. Can you draw any conclusions about the data? What might you expect to happen in 2011?**

The loon count happens as scheduled, rain or shine, so loon counters go out in all kinds of weather and some years, the weather may affect the results. The low count of adults in 1996 corresponded to a loon count day with rain, fog, and wind.

The summers of 2006 and 2007 had a relatively low count of adults (compared to previous years) but the second highest count of chicks ever! We aren't sure what happened that year. One possibility is that after the high count in 2005, there may have been too many loons in Maine, and they may have left willingly to find less crowded lakes. This is another possible explanation for the drops in 1996 (in addition to the weather) and 1997, following the "high" in 1995.

Other possible explanations for drops in the population include issues on the wintering grounds: diseases, environmental factors (oil spills), changes in fish populations, bad weather/storms. It's difficult to know how mortality during the winter affects Maine's breeding population of Common Loons.

One complicating factor in discussing loon count data is that we always take a sample of the data in order to make the statewide estimate. Students may wonder if years with a low or high count of loons can be explained by a change in the number of loon counters, but that isn't the case. No matter how many counters we have each year, we draw a random sample of 100 lakes to make the estimate.

- 2. Imagine that you are a staff biologist at BioDiversity Research Institute, and you have been asked to review "loon cam" video. Brainstorm what kinds of questions you might be able to answer by watching this type of video. Remember that the male and female loons can be identified in the video from their color-bands, and that the video camera is equipped with infrared capability, so it collects video throughout the night.**

*Who incubates the eggs? Does the male or female spend more time on the nest?* We actually know from video footage analysis that although the job of incubating the eggs is shared fairly equally between the male and female loon, the female spends more of her time at night on the nest. This may be a more stressful time to incubate the eggs.

## **CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH**

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*Are eggs ever left unattended by a parent?* Yes, parents occasionally leave the nest alone, but not for long periods of time.

*What do loons do at night?* Contrary to what you might think, loons do not spend their nights on the nest in deep sleep! Loons are awake and alert throughout the night, watching and listening to the night sounds all around.

*What kind of predators are near the nest?* The loon cam has actually recorded lots of small rodents passing near the nests, and for several years in a row it recorded a mink attempting to remove an egg from the nest. The mink was successful one year when there was no attending adult nearby, but in other years, when the adult was on the nest, it was chased out of the area by the incubating parent.

### **3. Can you think of any reasons why artificial nesting platforms might *not* be good for loons?**

Some people put out platforms because they want loons to be more visible and easier to see. If the resident loons are happy (and nest successfully) in their “natural” site and don’t use the platform, it may attract a new pair to the area. This may in turn lead to territorial battles (that wouldn’t have been there otherwise without the raft attracting the new loons in the first place!). Some people think that rafts attract too much attention from people because they tend to be more visible than natural nest sites. Rafts need a lot of attention to keep them functional. People need to pull them off the water in the fall (they are very heavy!) and put them back out in the spring. Sometimes people lose interest in maintaining a raft, then it slowly rots and sinks...not good if a loon has started to use it! Also, some people believe that placing artificial nests relaxes the need for conservation. If loons nests successfully on a platform, what is the need to protect shoreline from development?

### **4. If you were to create an outreach and education message about loon conservation, what are the 3-5 most important points you would want to include? Can you list a few key audiences where your message would be effective?**

Students should focus on messages about actions people can take to protect loon habitat: watching boat speeds when close to shore, limiting disturbance while feeding or on the nests, maintaining water quality, keeping invasive plants out of lakes, etc.. Some ideas for audiences include lake associations (groups of homeowners on a lake, most lakes have them), town councils (in towns with lake shore), schools, fishing groups, etc. There’s really no limit, but the idea is to get students thinking about the connection between the conservation message and the audience they could take it to.

## **CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH**

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### **DISCUSSION QUESTIONS (FOR STUDENTS)**

- 1. Look at the graph on page 56, which documents the loon population estimate for the last 20 years. Are there unusual data points in the graph? Brainstorm a list of four or five reasons that might explain variation in the survey results from year to year. Can you draw any conclusions about the data? What might you expect to happen in 2011?**
  
- 2. Imagine that you are a staff biologist at BioDiversity Research Institute, and you have been asked to review “loon cam” video. Brainstorm what kinds of questions you might be able to answer by watching this type of video. Remember that the male and female loons can be identified in the video from their color-bands, and that the video camera is equipped with infrared capability, so it collects video throughout the night.**
  
- 3. Can you think of any reasons why artificial nesting platforms might *not* be good for loons?**
  
- 4. If you were to create an outreach and education message about loon conservation, what are the 3-5 most important points you would want to include? Can you list a few key audiences where your message would be effective?**

## **CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH**

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### **CLASSROOM ACTIVITY: BUILD A RAFT!**

Subject/Topic Area(s): Habitat and Conservation  
Time frame: Approximately two 45 minute class periods  
Grade: 3<sup>rd</sup> – 6<sup>th</sup>  
Group Size: Up to 35

#### **Essential Questions**

- Can people create working habitat for loons?
- What are the benefits and risks of providing artificial habitat for wildlife?
- Can artificial habitat help a population survive?

#### **Objectives:**

Upon completion of this lesson students will be able to:

- Describe what type of habitat a loon needs based on information they can gather through observation and basic research.
- Discuss the pros and cons of artificial or human-created habitat for loons.

#### **Topics leading up to this activity**

Students should understand how animal adaptations give humans clues to understand that species' survival needs.

#### **Materials:**

Drinking Straws or popsicle sticks to act as a frame  
Playdough or other play clay (for raft corners)  
Something to support the nest (dental floss, pipe cleaners, yarn)  
Bucket of water to test rafts  
Copies of the [loon raft plans](#) (Appendix V) and photos on following page

#### **Room Set Up**

Have students work individually or in pairs. You may want to cover work area with newspaper for faster clean up.

#### **Introduction:**

People are drawn to providing “artificial” habitat for wildlife, especially birds! This can be a good thing, especially when the artificial habitat matches the needs of wildlife for food or shelter.

Loons nest along the shore, right next to the water so they can slip on and off the nest without being noticed by predators. Their nests are well camouflaged, often surrounded by dense vegetation. Nests can be flooded and the eggs washed away if lake levels rise dramatically, from big rain events or if the lake is dammed, to changes in dam operation. Artificial nests can provide an excellent alternative for loons where lake levels are constantly changing, or where fish are abundant but nesting habitat is lacking. In Maine, there are many lakes that host artificial nesting platforms for loons.

## **CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH**

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There is a downside to artificial platforms. From a human perspective, they require a lot of maintenance. They are relatively expensive to build, and have to be placed on the lake very early in the spring, as soon as possible after the ice melts. Platforms are bulky and heavy to move on and off the lake, and they need to be watched throughout the season to be sure they stay anchored in place. From a loon perspective, artificial rafts might draw in additional nesting loons when there is not enough room for additional territories, leading to boundary disputes and fights. Or loons may simply ignore the raft if they are happy with their existing nest site.

Maine Audubon encourages people to observe loons for up to three years before making a decision about placing a raft. If loons are successful in their natural nest site, raft placement is discouraged. However, if loons fail each year because of water level fluctuations, or if loons appear to have a territory in an area but never attempt to nest, then investing in a raft might be a good idea.

### **Development**

5-10 minutes: Given what students know about loon anatomy and physiology as well as what loons eat and where they live, have students make a list of the characteristics of the habitat loons need to survive. You could add structure by requiring each student group to create three lists: food, body structure and behavior, or different characteristics for different aspects of the loon's life (feeding, breeding, chick rearing).

5 minutes: Have each student quickly create a rough sketch of the loon's habitat that incorporates all of the above characteristics. Be sure they include nesting habitat.

25 minutes: Tell the students that, due to the popularity of lakefront homes, loons are losing nesting habitat. Challenge each student group to create a floating nest for a loon pair, using the materials you have provided. Remind them to keep in mind the list of characteristics that they generated. They should put their floating nest in context: Where is it placed in a lake? How close to a public beach? Is it in deep water or shallow water? A floating nest will not be successful unless it's placed within good habitat (refer to initial list). Students can test their inventions in the bucket of water and refine their structures as needed.

### **Conclusion and Debrief**

15 minutes: Have students explore each group's creation and write down notes about the pros/cons of each raft from the perspective of a loon.

10-15 minutes: Engage the students in a group discussion about how artificial/human-created habitats can help or hinder an animal population.

## CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH

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Photos of artificial and natural nest sites for loons



## **CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH**

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### **CLASSROOM ACTIVITY: HOW MANY LOONS?**

Subject/Topic Area(s): Monitoring, Surveys, Population Growth

Time frame: 45 minutes

Grade: 5<sup>th</sup>-6<sup>th</sup> Grade

Group Size: up to 35

#### **Essential Questions**

- What has happened to the loon population in Maine over time?
- Is there a difference in Maine loon population on different size lakes?
- Can we predict anything about the future of the loon population in Maine?

#### **Objectives:**

Upon completion of this lesson students will be able to:

- Create a graphical representation of a population over time
- Discuss what happens to a population over time
- Evaluate data points on a graph

#### **Topics leading up to this activity**

Students should understand these concepts: averages, graphing (x and y axes), data tables, sampling

#### **Materials:**

Photocopies of the data from the Maine loon count (pages 67-70)

Photocopies of the blank graph form (page 66)

Ruler and different colored pencils

Tracing paper or clear plastic for graph overlays (optional)

#### **Room Set Up**

Have students work individually or in pairs.

#### **Introduction:**

One of the ways scientists collect information about how well wildlife populations are doing is to look at the size of their populations over time. It takes many seasons of monitoring a wildlife population to determine an increasing or decreasing trend in its size, since there will be “normal” variation up and down from year to year. Ask students why a population might increase or decrease: amount of food available, kinds of shelter, weather, numbers and types of predators, etc. When conditions are good, more adults and their young survive (and maybe new individuals move into the area) and the population increases. When populations decrease dramatically, or steadily decrease over time, it’s a signal that something is wrong with their habitat. One complicating fact for loons is that they don’t breed until they are around 7 years old. Ask the students what would happen if one summer, no chicks survived. When would scientists see the effects?

#### **Development**

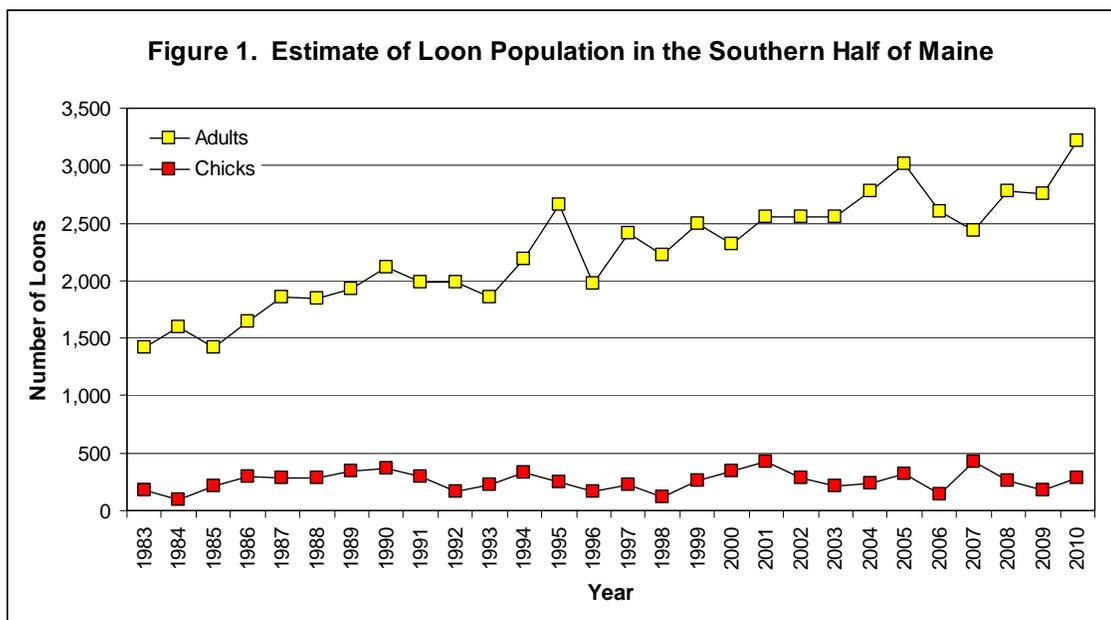
Let students know that this data was collected by community scientists. Community scientists are

## CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH

every day people in the community who don't necessarily have any training in science. These "loon counters" are a very diverse group of people, from doctors to lawyers, teachers to parents, kids, store clerks to professional photographers...there is no limit to who can become a loon counter. For the Maine loon count, these community scientists count the number of loons on a lake from 7:00 to 7:30 a.m. on the third Saturday in July each year. Then they submit their findings to Maine Audubon scientists, who analyze the data to understand the health of the loon population in Maine and how it is faring over time.

Have students use the data in Tables 1-4 to create graphs of the loon population over time across the state (Table 1), in Hancock County (Table 2), in Oxford County (Table 3) and/or on large and small lakes (Table 4). You can use blank graph paper or the template provided on page 66, with years as the x-axis (1983-2010) and different ranges for the number of loons on the y-axis. Students can graph the adults and chicks on separate graphs, or can combine the two for a more challenging project.

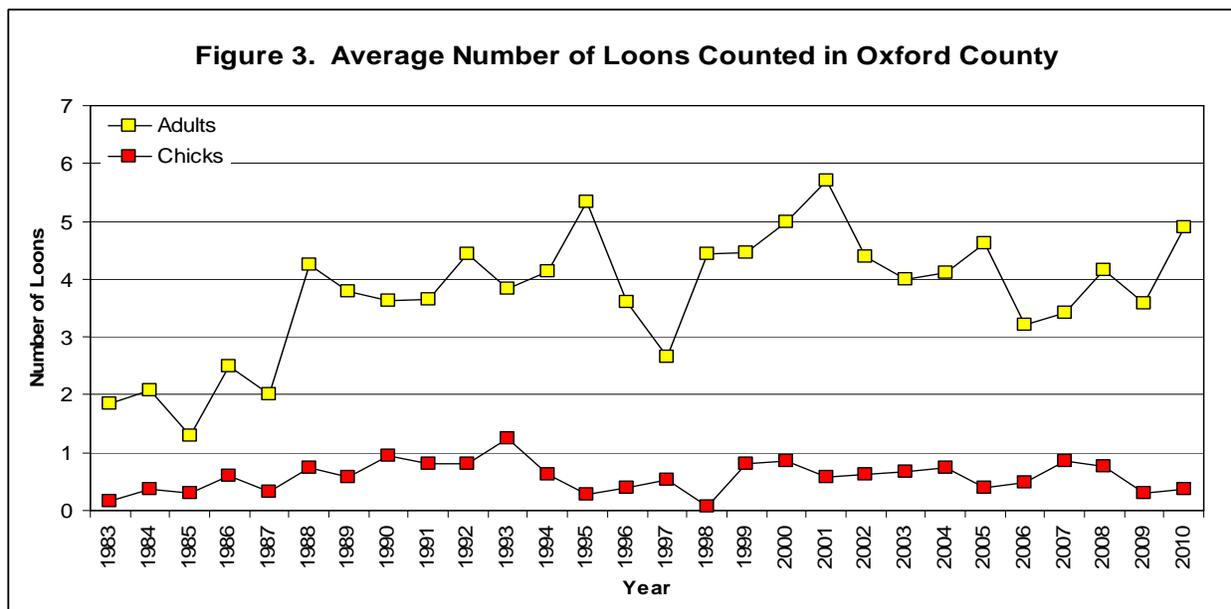
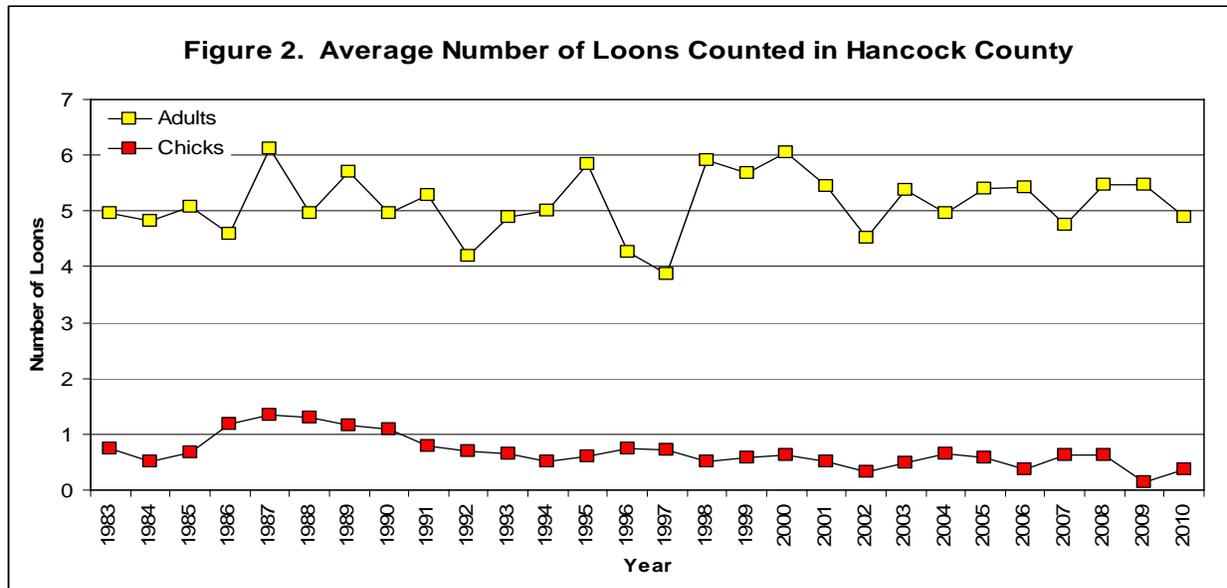
Sample graphs from Tables 1-4 are included below, along with a few discussion questions for each subset of the data that students might graph.



**Figure 1 (from data in Table 1):** The estimate of the loon population in the southern half of Maine. FMI, see Discussion Question #1 on page 59. What happens to the loon population over time? Is it different for adult loons vs. chicks? What are some potential reasons for drastic increases or decreases in the population? (Note that this is a population estimate taken from a sample of 100 lakes, so even though the number of lakes surveyed may change from year to year, the estimate is based on the same sample of data from 100 lakes over time.)

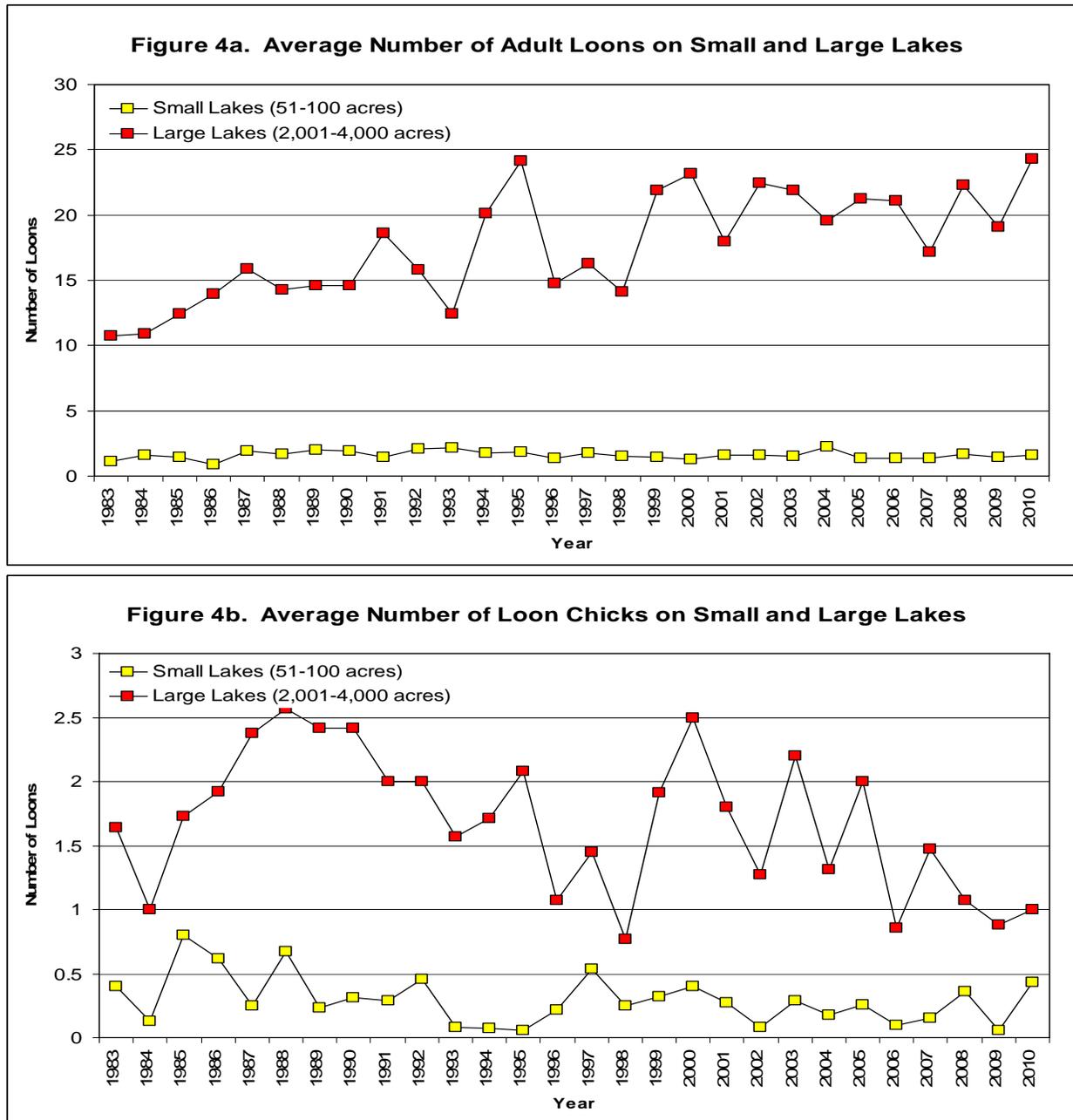
The sale of lead sinkers a half-ounce or less was banned in Maine in 2002. Does it look like this new law has affected the population? What role might humans play in population increases (and decreases)?

## CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH



**Figure 2 and 3 (from data in Tables 2 and 3):** The average number of loons counted in Hancock County (eastern Maine), and Oxford County (western Maine). Students can use tracing paper or clear plastic to overlay a graph of the number of lakes counted each year (listed in the tables), and compare this to the average numbers of loons each year. Remember that they will need to make the X axis the exact same length as the comparison graph. Are there years where fewer lakes were monitored but more loons were observed? Are there years when more lakes were monitored but fewer loons were observed? What might explain the variation? What are some reasons for the larger average number of loons in Hancock vs. Oxford county? *Possible reasons include lake sizes (Hancock County has larger lakes), number of lakes counted (more lakes each year counted in Hancock County), or residential development (Oxford lakes probably have more camps/people than the lakes surveyed in Hancock County).* Is average number of loons per lake a good number to use to look at changes in the population over time?

## CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH



**Figure 4a and 4b (from data in Table 4):** The average number of loons counted on small (51-100 acre) lakes vs. large (20001-4000 acres) lakes. Does the trend in average numbers differ between these two subsets of data? Again, look at the numbers of lakes counted each year. Why is there so much more variability/variety in the larger lake dataset? How does the scale on the x-axis affect the graph? Would you learn anything new by graphing the adult population on small lakes on its own graph?

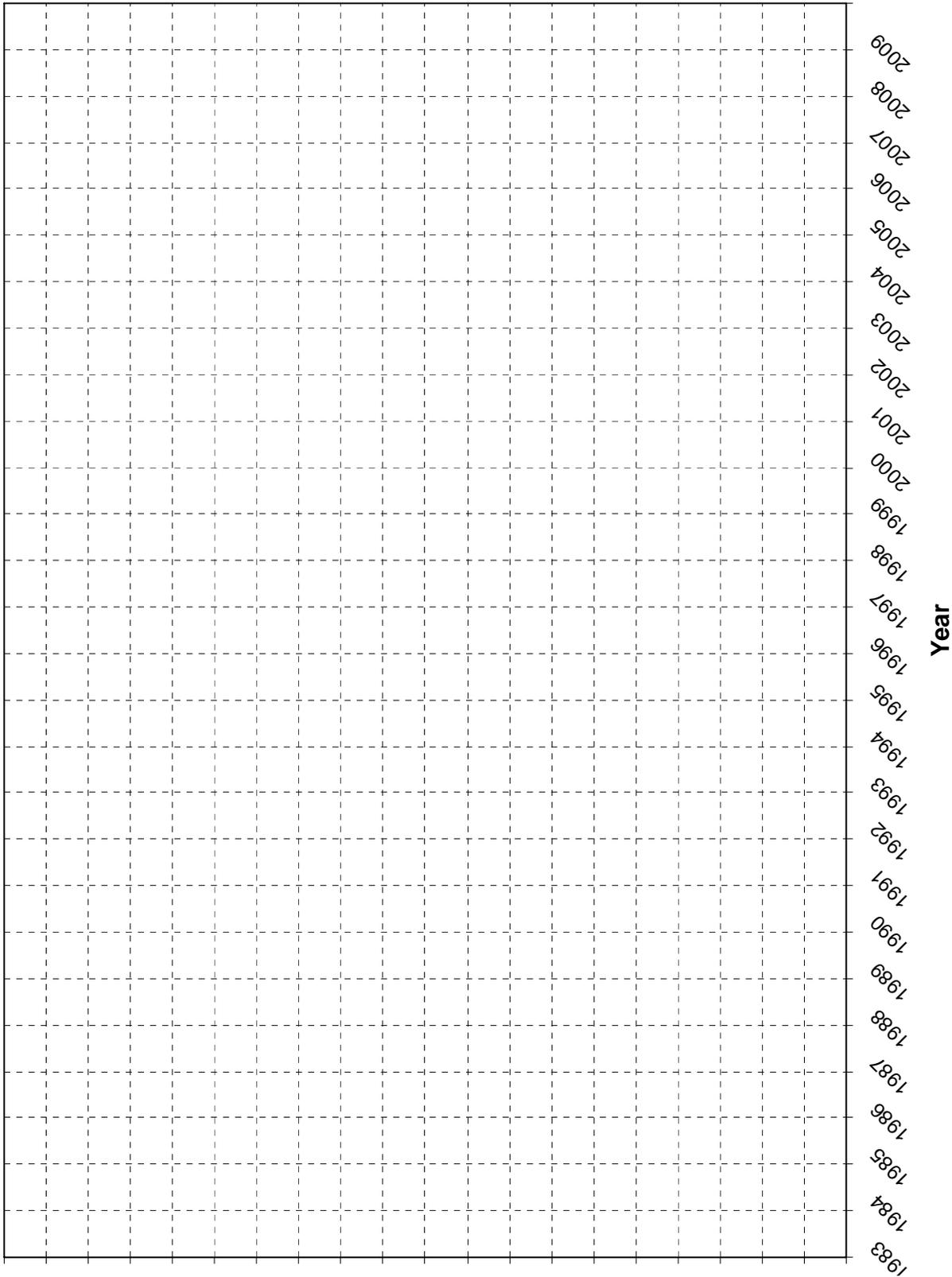
## **CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH**

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### **Assessment/Conclusion**

Conclude the activity with a discussion about how graphs help us “see” data. How does the scale on the y-axis affect the picture that’s presented? Do students have examples of graphs they’ve seen that show them a set of data? Is it easy to be convinced by a graph that shows an upward or downward trend? What might they want to watch for when interpreting data on a graph?

**BLANK GRAPH**



## **CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH**

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**TABLE 1. ESTIMATE OF LOON POPULATION IN THE SOUTHERN HALF OF MAINE**

Year	Estimated Total Adults	Estimated Total Chicks
1983	1,417	176
1984	1,601	100
1985	1,420	215
1986	1,649	292
1987	1,855	287
1988	1,846	286
1989	1,924	343
1990	2,121	368
1991	1,982	290
1992	1,982	163
1993	1,856	223
1994	2,185	326
1995	2,665	250
1996	1,970	161
1997	2,415	226
1998	2,226	120
1999	2,493	261
2000	2,318	345
2001	2,552	425
2002	2,555	282
2003	2,559	208
2004	2,774	237
2005	3,013	314
2006	2,596	141
2007	2,432	422
2008	2,784	265
2009	2,753	175
2010	3,220	283

## CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH

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**TABLE 2. AVERAGE NUMBER OF LOONS COUNTED IN HANCOCK COUNTY**

Year	Average # Adults	Average # Chicks	Number of Lakes Counted
1983	4.95	0.74	19
1984	4.82	0.50	22
1985	5.08	0.67	24
1986	4.59	1.18	22
1987	6.13	1.35	23
1988	4.95	1.29	21
1989	5.70	1.17	23
1990	4.96	1.08	26
1991	5.29	0.79	28
1992	4.19	0.70	27
1993	4.89	0.64	28
1994	5.00	0.52	27
1995	5.83	0.60	30
1996	4.26	0.74	31
1997	3.88	0.71	17
1998	5.90	0.52	31
1999	5.68	0.57	28
2000	6.04	0.62	26
2001	5.45	0.52	29
2002	4.52	0.33	27
2003	5.37	0.48	27
2004	4.97	0.66	29
2005	5.39	0.57	28
2006	5.42	0.36	33
2007	4.75	0.63	32
2008	5.47	0.62	34
2009	5.48	0.13	31
2010	4.89	0.36	36

## **CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH**

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**TABLE 3. AVERAGE NUMBER OF LOONS COUNTED IN OXFORD COUNTY**

Year	Average # Loons	Average # Chicks	Number of Lakes Counted
1983	1.84	0.16	25
1984	2.08	0.38	24
1985	1.30	0.30	10
1986	2.50	0.60	20
1987	2.00	0.32	22
1988	4.25	0.75	8
1989	3.79	0.57	14
1990	3.63	0.94	16
1991	3.65	0.82	17
1992	4.44	0.81	16
1993	3.83	1.25	12
1994	4.13	0.63	16
1995	5.33	0.27	15
1996	3.60	0.40	20
1997	2.65	0.53	17
1998	4.44	0.06	18
1999	4.47	0.80	15
2000	5.00	0.85	13
2001	5.71	0.57	14
2002	4.38	0.63	16
2003	4.00	0.67	21
2004	4.11	0.75	28
2005	4.61	0.39	18
2006	3.22	0.48	23
2007	3.42	0.85	26
2008	4.15	0.77	26
2009	3.57	0.29	21
2010	4.89	0.36	36

**CHAPTER 6: COMMON LOON CONSERVATION AND RESEARCH**

**TABLE 4. AVERAGE NUMBER OF LOONS COUNTED ON DIFFERENT SIZED LAKES**

Year	Size Class 2 (51-100 acres)			Size Class 6 (2,001-4,000 acres)		
	Avg # Adults	Avg # Chicks	# Lakes	Avg # Adults	Avg # Chicks	# Lakes
1983	1.13	0.40	15	10.73	1.64	11
1984	1.63	0.13	16	10.92	1.00	13
1985	1.47	0.80	15	12.45	1.73	11
1986	0.92	0.62	13	13.92	1.92	13
1987	1.92	0.25	12	15.92	2.38	13
1988	1.67	0.67	6	14.29	2.57	7
1989	2.00	0.23	13	14.58	2.42	12
1990	1.92	0.31	13	14.58	2.42	12
1991	1.47	0.29	17	18.57	2.00	14
1992	2.08	0.46	13	15.83	2.00	12
1993	2.17	0.08	12	12.43	1.57	14
1994	1.80	0.07	15	20.14	1.71	14
1995	1.81	0.06	16	24.15	2.08	13
1996	1.35	0.22	23	14.73	1.07	15
1997	1.77	0.54	13	16.27	1.45	11
1998	1.50	0.25	20	14.15	0.77	13
1999	1.43	0.32	21	21.91	1.91	11
2000	1.30	0.40	20	23.17	2.50	12
2001	1.64	0.27	22	18.00	1.80	15
2002	1.63	0.08	24	22.45	1.27	11
2003	1.52	0.29	21	21.87	2.20	15
2004	2.21	0.18	28	19.56	1.31	16
2005	1.37	0.26	27	21.23	2.00	13
2006	1.39	0.10	31	21.07	0.86	14
2007	1.35	0.15	34	17.20	1.47	15
2008	1.72	0.36	36	22.29	1.07	14
2009	1.41	0.06	32	19.06	0.88	16
2010	1.63	0.43	40	24.27	1.00	15

## APPENDICES

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### APPENDIX I: QUICK FACTS ABOUT THE COMMON LOON

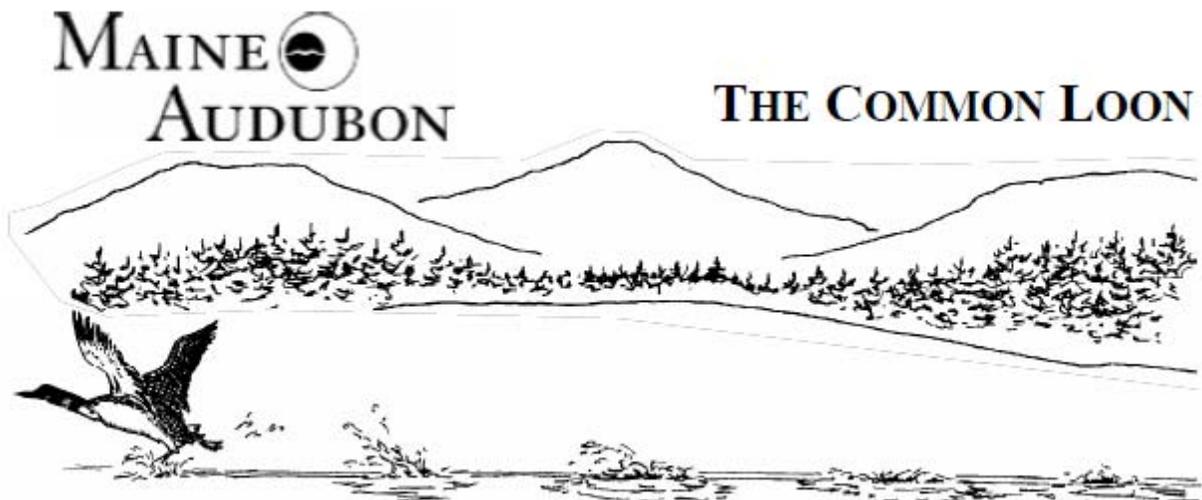
- Age (Individual):** 15-25 years
- Age (Species):** About 30 million years. Relatively young for a bird species.
- Chicks:** Precocial (hatch active and able to leave the nest) after about 28 days  
Within 12 – 24 hours: Leave the nest with one or both parents.  
First day: Make shallow dives.  
Eighth days: Begin diving for food.  
First month: dependent primarily on adults for food  
Six weeks: Reach adult size.  
Six – Eight weeks: Attain self-sufficiency  
10 weeks: Begin trying to fly  
11 weeks: Initial flight
- Courtship:** Gentle, ritualized bill-dipping, shallow dives and head rubbing between males and females.
- Diet:** Mainly fish but also frogs, salamanders, crayfish, leeches and aquatic greens.  
  
Loons are visual predators, grasping prey in their bills (they do not spear prey). They can swallow prey underwater, or may surface before consuming prey.
- Dives:** Depths unknown but perhaps to 180 feet.  
Duration under 1 minute on average (about 45-50 seconds). Unlikely longer than ~3 minutes..
- Eggs:** Typically 2 large eggs laid one day apart, olive-green brown with dark brown spots, 3 3/8 inches long, 2 1/4 inches in diameter.
- Flight:** Runway, 1/8 to 1/4 mile  
Air speed, 60 to 90 mph.
- Incubation:** Approximately 29 days; shared by both parents.
- Migration:** Fall – October and November; pre-migratory flocking occurs on staging lakes; flight groups usually small.  
Spring – April and May; males arrive within a few days of ice out; females arrive a few days later.

## Appendices

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- Molt:** Flight feathers, once each year in January. Breast and back feathers, twice each year (Sept. – Oct. and Feb. to late March).
- Nest:** Pile of mud and available vegetation with shallow depression in the middle.
- Nest Site:** At or near water's edge and protected from prevailing winds; some well camouflaged, others exposed. Also nest in marshes and bogs. Island locations sometimes preferred.
- Physical Description:** Male and female identically colored. Summer plumage (alternate): glossy black head, black neck with white-and-black necklace around throat, checkered black-and-white back and wings, white underparts; straight and black bill; eyes deep red. Winter plumage (basic): dull gray brown back; white breast and belly.
- Predators:** Chicks: large fish, snapping turtles, eagles. Eggs: raccoons, gulls, crows, ravens, skunks, mink and otters.
- Range:** Summer nesting grounds: Canada, Alaska, Iceland, Greenland, Northern U.S.A (ME, MA, NH, VT, MI, WI, MN, MT, WA, ID).
- Scientific Name:** *Gavia immer*.
- Sexual Maturity:** Three years for loons to reach maturity. 7 – 11 years until first nest.
- Size:** Length: 28 – 35 inches.  
Weight: 8 – 14 pounds.  
Wingspan: Up to 58 inches  
Males are slightly larger than females

## APPENDIX II: COMMON LOON NATURAL HISTORY PAMPHLET



The loon has held a special place in the imagination of humankind since earliest civilization. The striking symmetry of its plumage, its soulful cry, and its ability to seemingly vanish under water have inspired legends of magic, mysticism, and creation. Even today, few can hear the cry of the loon drift across a dusky lake without sensing an ancient spirit and believing that magic can, indeed, exist among the mists of northern lakes.

### GENERAL DESCRIPTION

There are five species of loons in the world, but only the common loon (*Gavia immer*) breeds in Maine. Common loons are large birds, almost three feet from head to tail, and have a wingspan of almost four feet. They are also heavy, weighing on average about nine pounds. Our loons tend to be a few pounds heavier, and a male in peak breeding condition in Maine can weigh up to 14 pounds. Males are slightly larger than females.



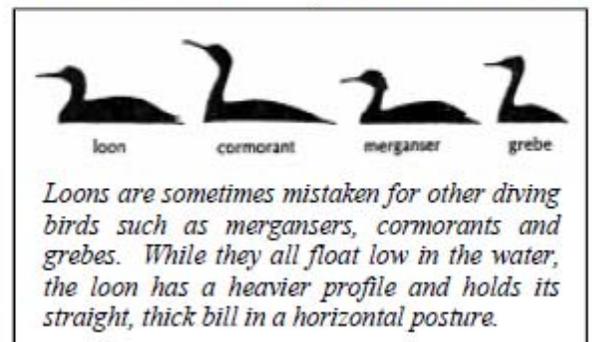
The common loon has a striking breeding plumage, with a pure white breast and underparts. Its distinctive black wings and back are striped and spotted with white, and its neck and head are greenish-black with an open necklace of white stripes. The eye is a dramatic ruby red, which aids in underwater vision. In the fall, this summer finery is replaced with dull gray, white, and brown winter plumage. Juveniles keep this dull plumage at least through their second winter.



Unlike most other birds, loons have solid rather than hollow bones. While this extra weight makes flying more difficult, it makes diving for food easier. In flight, the loon's relatively small wings and tail give the bird a pointed and hump-backed appearance. The high ratio of body weight to wing size makes it difficult for loons to take flight and they must strenuously flap their wings while running across as much as a quarter mile of open water. Once airborne, loons are powerful fliers and reach speeds of ninety miles per hour.

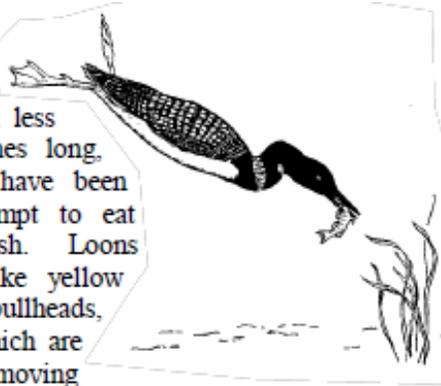
Loons are exceptional divers, and spend much of their time diving to catch fish. Most feeding dives are relatively shallow and last about a minute. Loons may be able to dive to 200 feet but this is probably not that common. Before a long dive, loons reduce their buoyancy by compressing feathers and exhaling to direct the flow of oxygen-rich blood only to vital organs.

Loons have long, flexible necks and powerful feet that allow them to maneuver underwater with ease. They find their prey by sight, so water quality is very important. You may see a "headless" loon peering underwater looking for fish. Loons eat fish almost exclusively, but they will also forage on crustaceans and insects if they are stressed or if fish



## Appendices

aren't available. They usually eat fish less than eight inches long, although they have been known to attempt to eat much larger fish. Loons prefer fish like yellow perch, suckers, bullheads, and sunfish, which are relatively slow moving and are easier to catch. However, they will eat whatever they can catch and generally will tend to eat whatever's most common in a lake. Adult loons will eat about two pounds of fish a day, and a family of four will consume a little over 900 pounds of fish during the five to six month breeding season.



### LIFE HISTORY

Loons have an uncanny knack of arriving on Maine's lakes each spring very close to the day of ice-out. The males arrive first, and their migration closely follows the ice as it melts north and inland. This assures they'll be first to get on a lake and start defending a territory. Territories range in size from 20 to 200 acres of water, and average about 100 acres.

Females arrive on the breeding grounds about two weeks after the males. Courting rituals begin almost immediately and include running across the water, wing-flapping, simultaneous diving, bill-dipping, and an array of haunting calls. The male loon claims his territory with a unique yodel, while

both sexes maintain vocal contact with an eerie wail or a quiet, low hoot. The tremolo, or laughing call, is perhaps the loon's best-known vocalization and indicates excitement or alarm.

Contrary to popular folklore, loons do not mate for life. Pair bonds last on average about seven years. In most cases pair bonds fail when a new loon moves onto a territory and challenges the resident loon. Usually, but not always, these are male birds. Loons will battle to the death for their territories, but more often the weaker loon gives up the fight and flies off.

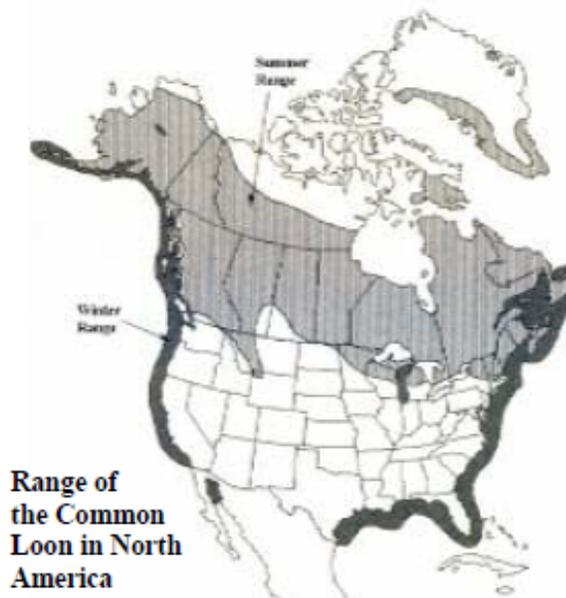
Because a loon's legs are located at the very back of their body, they move awkwardly on land. They build their nests within a few feet of the water's edge so they can slip quickly and easily on and off without being noticed. Nests are made by both males and females who pull grass and other vegetation into a sizeable pile. While islands may be safest from terrestrial predators, nests are also built in marshy areas and along lakeshores.

Females usually lay two (sometimes one or three) large, mottled brown or olive-green eggs.



Typical dates for egg-laying in Maine are between mid-May and mid-June. Both parents incubate the eggs for about 29 days. The chicks are able to swim almost immediately after hatching and the loon family then leaves the nest for a nearby nursery area. The downy chicks often ride on the backs of the parents to rest, keep warm, and avoid large fish, snapping turtles, and other predators. After only a week, the chicks can dive short distances underwater and catch some of their own prey, although they rely on their parents to continue to feed them minnows and small fish. The young birds stay with the parents until they are fully able to fish and fly at about ten or twelve weeks.

Just before the fall freeze-up, large groups of loons gather together on lakes before migrating to the ocean. The breeding birds generally return to the same lake each spring and often to the same territories, usually on or near the lake where they were raised. Young birds will wander for about seven years along the coast, and in summer sometimes on freshwater lakes, before securing a territory and raising their own young. If loons are lucky, they'll live to be between 25 and 30 years old.

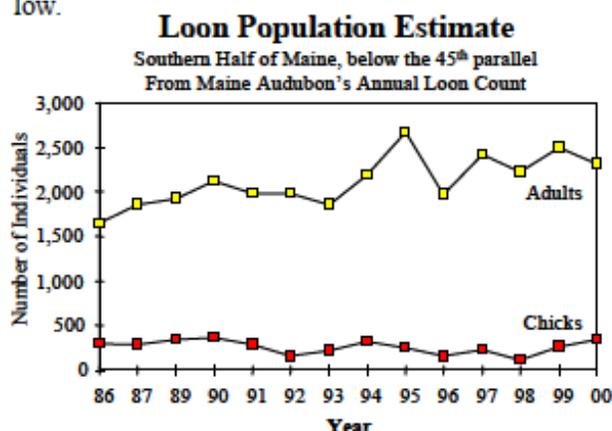


Range of the Common Loon in North America

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### LOONS IN MAINE

Like many animals, loons must compete with humans for habitat. Loons no longer nest in Pennsylvania, Connecticut, or Rhode Island. Loons have recently returned to nest in Massachusetts for the first time in many years. New Hampshire has over 200 pairs of nesting loons, more than double the number from the early '70s. Vermont, which nearly lost its loon population in the '80s now has about 40 breeding pairs. In Maine, loons are found statewide and their population seems fairly stable at about 4,300 adults. Yearly estimates of the loon population in the southern half of the state are summarized below.



### LOONS AND PEOPLE

Breeding loons need large territories with nesting sites on islands or lakeshores that are protected not only from natural elements such as weather, storm waves, and predation, but also from boat wakes, scheduled water level changes, and other human disturbance.

We can take measures to minimize human impacts on loons. On lakes where dams control water levels, nests can be either flooded or stranded above the water's edge, too high for the loons to reach. In this case, artificial floating platforms may enable the loons to nest successfully. Where breeding loons are disturbed frequently, buoys can be placed around the nest to keep human traffic at a safe distance.

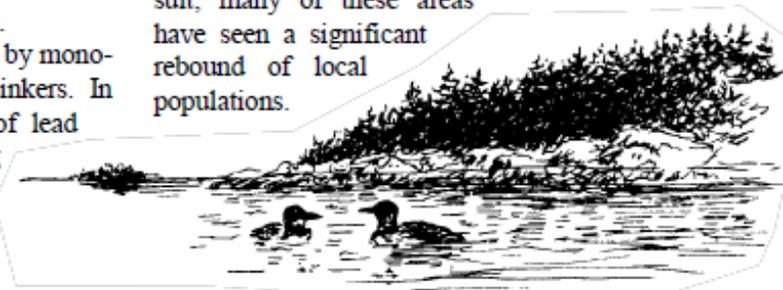
Increasingly, loons are found entangled by monofilament fishing line and poisoned by lead sinkers. In fact, lead poisoning from the ingestion of lead sinkers and lead-headed jigs is the leading cause of death for adult loons in Maine and throughout New England. In part be-

cause of concern over the loon population, the sale of small lead sinkers (a half ounce or less) will be banned in Maine after January of 2002. Non-toxic alternatives made of steel, ceramic, and bismuth are increasingly available at many retail outlets. Anglers and others can also help loons by retrieving loose fishing line.

Maine lakes have the highest levels of mercury in the U.S. Major sources of mercury into our waters include industrial plants, municipal incinerators, and coal-burning power plants located in the

midwest. Mercury accumulates in fish, and because loons eat fish almost exclusively, they accumulate even higher levels of mercury. Many loons throughout Maine harbor high levels of mercury, and early research indicates that this is having an impact on reproductive success. Loons with high levels of mercury spend less time incubating their eggs and feeding their chicks, and subsequently have lower reproductive success. Measures to decrease mercury in the waste stream, both within Maine and across the U.S., are important for reducing the impacts on loons and other wildlife.

With dedication and hard work, some remaining loon habitat is being protected. Many organizations and volunteers across the northern U.S. and Canada monitor loon populations, produce and distribute educational materials, and work with government agencies and public utilities to insure adequate protection of loon nesting habitat. In states where these conservation efforts have been underway for more than a decade, the public, lake-dwellers, boaters, and hydropower companies are learning to alter their practices to accommodate the loons' needs. As a result, many of these areas have seen a significant rebound of local populations.



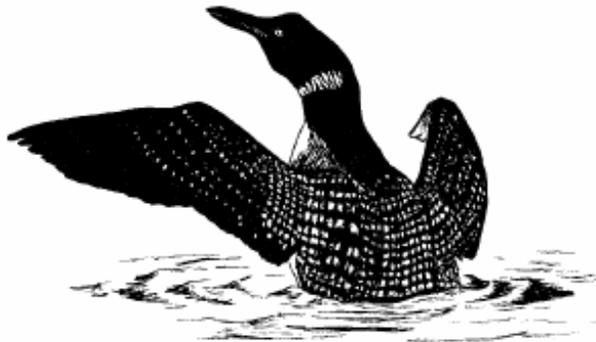
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### THE MAINE LOON PROJECT

The Maine Loon Project started in 1977 to assess the status and future of Maine's loon population. Activities of the Maine Loon Project include education and outreach on loon and lake issues, as well as advocacy and legislative lobbying regarding issues like mercury emissions, lead-free fishing tackle, and shoreland zoning. Every summer, over 500 volunteers participate in the annual Loon Count, which for the last two decades has produced a reliable assessment of Maine's loon population. Loon Project staff assist with habitat enhancement and protection efforts, offer comment and advice on development planning and legislation, conduct original research, and participate in public workshops. In addition to slide show presentations for adult audiences, the Loon Project also offers a "Loon Kit" for teachers who would like integrate loons into their classroom curriculum. The Maine Loon Project publishes a bi-annual newsletter, *The Loon News*. If you would like a copy of the latest issue, or would like more information, please contact:

Maine Loon Project  
Maine Audubon  
20 Gilsland Farm Road  
Falmouth, ME 04105  
(207) 781-2330  
conserve@maineaudubon.org  
www.maineaudubon.org



"That night it was still, and in the moonlight the loons began as I had heard them before, first the wild, excited calling of a group of birds, dashing across the water, then the answers from other groups until the entire expanse of lake was full of their music. We sat around until long after dark and listened."

-Sigurd F. Olson

Maine Audubon is a state-wide, independent, non-profit, membership organization dedicated to the protection, conservation and enhancement of Maine's ecosystems through the promotion of individual understanding and action.

*Written & illustrated by Bob Hooper, edited by Bill Hancock, layout/design by Eva Thompson ('93); edited and updated by Susan Hitchcox ('01).*

### WHAT YOU CAN DO

There are many ways you can help loons!

- **Enjoy these majestic birds from a distance;** stay clear of loons and their nesting areas when boating, fishing, and picnicking.
- **Post "Look Out For Loons" signs** (available from Maine Audubon) at boat landings and other access points.
- **Use lead-free fishing tackle,** and encourage fellow anglers to do the same. Urge local retailers to carry lead-free alternatives.
- **Collect loose monofilament line.** Loons die every summer after they are hopelessly entangled in lost fishing line.
- **Sponsor a loon slide show** for a local group and distribute educational materials to lakeshore residents in your community.
- **Participate in the annual loon count** and monitor nesting activity on a lake.
- **Protect water quality** by limiting fertilizer use and creating buffer zones along lakefront property. Contact the Maine Department of Environmental Protection at 287-7688 for more information.
- **Join your local lake association and the Maine Congress of Lake Associations.** Be active in association activities and workshops.
- **Make a donation to the Maine Loon Project.** The Maine Loon Project operates almost entirely on generous donations from people like you who are concerned with the future of loons in Maine. Your contributions to the Loon Project and your membership with Maine Audubon will help assure continued success in loon conservation efforts.

## APPENDIX III: LOON PROTECTION PAMPHLET



The common loon is a well known and loved bird of northern lakes. The sound of its haunting call and sight of an adult in full breeding plumage bring magic to Maine's lakes. People often come to Maine with hopes of seeing a loon and their chances of doing so are excellent. The latest estimates put the population of loons in Maine at about 4,000 adults and around 250 new chicks each summer. The population has been fairly stable in Maine over the last twenty years, but loons still face many threats on our waters. The Maine Loon Project, part of Maine Audubon, has worked on loon conservation since 1977 with education and outreach programs, research projects, and on-going management activities. Only through active involvement of concerned citizens like you can we expect these birds to continue thriving in Maine. This fact sheet outlines the major threats to loons in Maine, and what you can do to help these impressive birds.

### HABITAT LOSS DUE TO DEVELOPMENT

Loons are known to return to traditional nest sites year after year. Buildings and boat ramps on islands and shorelines near traditional loon nesting sites can cause loons to abandon nest sites.

#### What You Can Do:

1. Be aware of where loons nest in your area. Watch for loons returning after lake ice melts, and watch where pairs or adults with chicks spend their time.
2. Try to protect these areas through town planning processes and proper siting of boat ramps and other development.
3. Help gather long-term data on loon populations by participating in Maine Audubon's annual loon count on the third Saturday of July.

### FISHING LINE AND LEAD FISHING TACKLE

Lead poisoning from the ingestion of lead sinkers and lead-headed jigs is the leading cause of death for adult loons in Maine and throughout New England. There is no cure for lead poisoning, and once a loon ingests a lead sinker it dies in a few weeks. Every year, loons in Maine also die after they become entangled in fishing line or swallow hooks or lures.



#### What You Can Do

1. Use only lead-free fishing sinkers and jigs, available at many retail outlets. In fact, the sale of lead sinkers 1/2 ounce or less will be banned in Maine after January 2002.
2. Alert other anglers to the problems associated with tackle and urge them to switch to lead-free alternatives.
3. Tell tackle shop owners and other retailers about the availability of lead-free alternatives.
4. Retrieve all loose and broken fishing line and fishing tackle.

## LOON PROTECTION



### BOATING ACTIVITY

Because loons use all different parts of a lake, from deep waters for feeding to sheltered coves, bays and marshy areas for nesting and raising young, they are subject to all types of disturbance from boating activity.

Wakes from boats can wash eggs out of lakeside nests. Loons can also be easily disturbed off nests by boat traffic and recreational activities, leaving their eggs vulnerable to predators or exposure. Fishing boats that approach a nest and remain nearby for long periods of time can disturb nesting loons, as can quiet kayaks and canoes that maneuver easily into shallow areas. Heavy and continuous boat traffic can even cause some loons to abandon their nests altogether. On some lakes, loons have adapted to heavy boat traffic and will remain on their nests despite steady disturbance.

Maine Audubon receives reports each summer of boats chasing and harassing loons, and more than two dozen loons have died as a result of boat-related injuries in Maine over the last ten years. Loons that are harassed while feeding by boaters may not be able to adequately feed themselves or their chicks. Boats can easily get between adult loons and their young and can separate a family. A lone chick that can't relocate its parents will die without their protection.

#### What You Can Do:

1. Report harassment to the Warden Service at the Department of Inland Fisheries and Wildlife. You will need the boat license number and documentation of the incident.
2. Educate your lake community and boaters about loons. Obtain copies of Maine Audubon's "Living with Loons" brochure to distribute at local lakes.
3. Post large, bright-yellow "Look Out For Loons!" signs (available from Maine Audubon) at marinas and boat launches to let lake users know loons are nearby.
4. Use binoculars to view loons from a distance. Do not approach nests and loons on the water, especially if the loons are calling and displaying, a sure sign you are too close!
5. Observe the 200-foot "no wake zone" to assure that wave action will not destroy lake-side nests. Encourage fellow boaters to do the same.



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## WATER QUALITY

Loons are visual predators and must have clear, clean water to be effective predators. Water quality is affected by shoreline development, agricultural and lawn runoff, logging activities, sewage, and atmospheric pollution.

Invasive aquatic plants like variable-leaved and Eurasian milfoils change the quality of lake habitat. By growing in thick, choking mats they reduce the diversity of fish and invertebrate populations and have an impact on loons and other wildlife.

Acidified lakes are unable to support certain fish life. Loons attempt to raise young in some of these lakes but cannot catch enough fish for their chicks to survive.

Maine lakes have very high levels of mercury. Mercury is taken up by fish, and in turn by loons. Loons with high levels of exposure to mercury have been shown to have many irregular behaviors, leading to decreased reproductive success.

### What You Can Do:

1. Contact your legislators and urge them to sponsor and support mercury-reduction bills at both state and federal levels.
2. Keep your boat trailer free from aquatic plants when traveling, especially when coming into Maine from other states.
3. Maintain shoreline buffers and look into other measures developed by the Maine Department of Environmental Protection to reduce siltation and maintain water quality.
4. Use only phosphorous-free fertilizer on your lakeside lawn.
5. Become a steward for water quality in your lake through your local lake association or the Maine Congress of Lake Associations.

## WHO TO CONTACT:

Maine Audubon, Maine Loon Project, 20 Gilsland Farm Rd., Falmouth, ME 04105, (207)781-2330, [conserve@maineaudubon.org](mailto:conserve@maineaudubon.org), [www.maineaudubon.org](http://www.maineaudubon.org); For general information about loons, their population in Maine, lake-specific loon information, reports of dead or injured loons, "Look Out For Loons!" signs, loon kits and other educational material for teachers, loon slide shows.

Maine Dept. of Inland Fisheries & Wildlife, Warden Service, 284 State St., 41 SHS, Augusta, ME 04333, 1-800-322-3606, [www.state.me.us/ifw/index.html](http://www.state.me.us/ifw/index.html); To report injured loons or harassment of loons and other wildlife.

Maine Dept. of Environmental Protection, 17 State House Station, Augusta, ME 04333, (207)287-7688, [www.state.me.us/dep/home.htm](http://www.state.me.us/dep/home.htm); For information about dams, mercury, soil erosion, milfoil and other invasive aquatics, and general water quality.

Maine Congress of Lake Associations, P.O. Box 38, Readfield, ME 04355-0038, Toll free: 1-877-524-2511, [info@mainecola.org](mailto:info@mainecola.org), [www.maineola.org](http://www.maineola.org); For information about lakes and water quality.

North American Loon Fund, P.O. Box 68, Mount Pleasant, MI 48804, (603) 279-6163, [loonfund@hotmail.com](mailto:loonfund@hotmail.com), [facstaff.uww.edu/wentzl/nalf/analfhomepage.html](http://facstaff.uww.edu/wentzl/nalf/analfhomepage.html); For listings of loon organizations in North America, information on national loon issues, educational materials.

Maine Audubon is a state-wide, independent, non-profit, membership organization dedicated to the protection, conservation and enhancement of Maine's ecosystems through the promotion of individual understanding and action. For more information contact Maine Audubon, 20 Gilsland Farm Rd., Falmouth, ME 04105, (207) 781-2330 or visit [www.maineaudubon.org](http://www.maineaudubon.org).

Written by Barbara Charry and illustrated by Bob Hooper, 1991.  
Edited and updated by Susan Hitchcox, 2001.

## FLUCTUATING WATER LEVELS

Loons in Maine typically sit on eggs from the middle of May through June, though they can also nest later in the summer. The eggs take about 29 days to hatch. Because loons build their nests within a few feet of the shore, changes in water levels can cause nest failure by either flooding eggs or stranding nests too far above the water for adults to reach.

### What You Can Do:

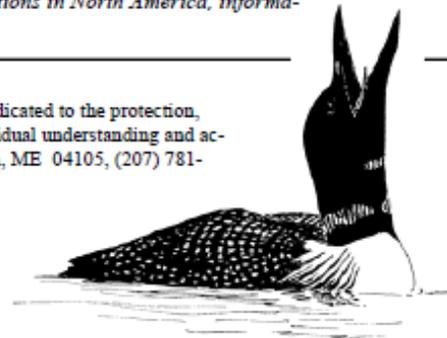
1. Water levels on many lakes are controlled by dams. Contact your local dam operator and explain the problems fluctuating water levels may cause for loons nesting in the area. Ask if it is possible to hold water levels constant during the critical nesting period from mid-May through June. To find dam operators, contact the Maine Department of Environmental Protection (see box below).
2. If water levels cannot be maintained and nests are repeatedly failing from water level fluctuations, look into placing an artificial loon nesting platform on the lake. Maine Audubon has directions for building platforms, and these come with an evaluation form to assess the feasibility of this management option. Evaluation forms should be filled out and returned to Maine Audubon.

## PREDATORS

Predation is a major cause of nest failure. Raccoons, skunks, American crows, common ravens, and herring gulls are major predators of loon eggs and chicks. These scavengers have increased in number due to plentiful human garbage.

### What You Can Do:

1. Secure garbage cans and do your part to collect lakeshore litter.
2. Keep pet food out of reach of wildlife.



## APPENDIX IV: LIVING IN LOON TERRITORY POSTER/BROCHURE

For best results, enlarge to 11 x 17 when printing.



# Loon

### You can help reduce conflicts between people and loons.

#### Residents & Visitors

Loons need clean, clear water so they can catch fish. Shoreline development can impact water quality by increasing run-off, erosion and contamination by household chemicals. Shoreline development may eliminate nesting habitat or reduce habitat quality by increasing disturbance and predation.

**A few simple things you can do to help loons:**

- Reduce run-off and erosion from your waterfront property by encouraging natural vegetation along the shoreline.
- Use only phosphate-free detergent and fertilizer.
- Keep pets from running wild along lake shores and harassing wildlife.
- Make sure garbage is out of reach of loon predators like skunks and raccoons.
- Enjoy loons from a distance with binoculars or a spotting scope, especially if they are nesting near your camp.

#### Boaters

Loons can be difficult to see, and may surface unexpectedly when they're diving for fish. Collisions with speeding boats and personal watercraft are unfortunately one of the leading causes of death for loons in Maine.

Wakes from boats can flood a loon's shoreline nest, and they can easily overwhelm small chicks. This is a particular problem when personal watercraft circle in one area for long periods of time.

Canoes and kayakers who move easily in shallow water can get much too close to unsuspecting loons on their nests. They may unwittingly sneak up on loons and startle them off nests, leaving eggs unprotected while they paddle by.

#### Anglers

Healthy fish populations make lakes and ponds popular for both loons and anglers.

Anglers who stay for long periods in secluded coves can disturb nesting adults. The loons can be spooked off their nest, leaving their eggs susceptible to predators and the elements.

Fishing gear poses problems for loons. Every year, loons in Maine die after becoming tangled in monofilament line. Lead poisoning from lead sinkers and lead-headed jigs is the leading cause of death for adult loons in Maine.

The sale of lead sinkers one half ounce or less is now banned in the state.

#### A few tips for fishing with loons:

- Avoid fishing for prolonged periods in secluded coves where loons may be nesting or feeding, especially in early summer when the eggs and young chicks are most vulnerable.
- Use only lead-free fishing sinkers and jigs, and properly dispose of old lead tackle.
- Retrieve broken fishing line.
- Properly dispose of spent fishing line and pick up discarded line in the water or along shore.

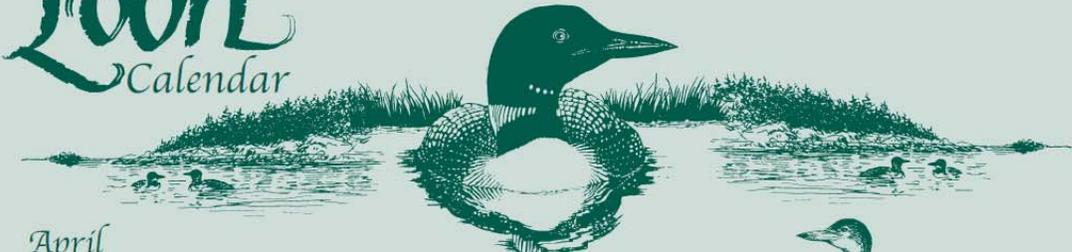
#### Be aware of the many Maine laws that help protect wildlife and wildlife habitat!

Please see reverse for more detailed information.

Common Loons are protected by both state and federal laws prohibiting harassment of wildlife. For more information about those laws or to report violations, contact the Department of Inland Fisheries and Wildlife at (207)287-8000.

# Loon

## Calendar



### April

Common Loons return to Maine's lakes right after ice out, and spend about a month establishing their territories and bonding with their mate.

 Watch for pairs of loons exhibiting courtship displays like dipping their bills in the water or swimming around each other in circles.

### May-June

Loons build their nests of dead vegetation and mud right on the shoreline, away from wind, waves, people, and predators. They often nest on small islands where there are fewer predators and people.

 Watch for single birds in quiet, shallow coves and near islands, since parents must take turns sitting on the eggs.



### July-August

After about 27 days, the eggs hatch and the loon family moves to a nearby "nursery" area. The loon parents spend much of their time catching small fish for hungry chicks. Chicks ride on their parents' backs to stay warm and safe from predators.

 Watch for pairs of loons with one or two small chicks in tow or on their backs. The chicks are quite small when they first hatch, so may be difficult to see.

### September-October

Most chicks can now feed themselves and fly. Their parents leave them to congregate in large groups, or "rafts". Groups of chicks will gather together later in the fall in "rafts" of their own.

 Watch for large gatherings of loons on lakes and ponds. Adult loons may be molting into their dull gray and white winter plumage so may look very similar to the drab but full-grown juveniles.

### November-March

Loons spend the winter resting and feeding along the coast. Juvenile loons will wait about seven years before they return to fresh water to breed.

 Watch for the dull gray and white plumage of wintering adults and juveniles close to shore all along the coast of Maine.



**W**atching Common Loons and listening to their haunting calls is a popular activity for visitors to Maine's lakes and ponds. Loons have many fascinating behaviors that are easy to observe from afar. If you're lucky, you may see a loon dive for a fish and feed its chick. Or you may see a loon preen its feathers or peer in the water, looking for its next meal.

For the best view, watch loons with binoculars or through a spotting scope. Loons can be very sensitive, and may stop feeding their chicks or leave their nest and eggs if disturbed. Luckily, loons are very good at letting you know when you've come too close.

#### Watch for these signs:

A loon is splashing across the water doing the "penguin dance." The loon appears to stand up in the water and move toward you in an aggressive manner, sometimes also making the distinctive "yodel" call.



A loon is vocalizing at you. Listen for the "tremolo", a quavering laugh commonly given when loons are annoyed or alarmed.



A loon is lying very flat on the shoreline with its head down. The loon is on a nest and if approached will slide into the water, leaving the eggs exposed to predators and the elements.



**If you see these signs, take the hint and move away!**



**Please obey Maine's laws that protect wildlife and wildlife habitat:**

#### Shoreland Zoning:

Activities like logging, clearing, and construction are restricted within 250 feet of lakes and ponds 10 acres or larger and within 75 feet of streams by Maine's Shoreland Zoning Act. Your town may have additional rules, so check with them for details or call the Maine Department of Environmental Protection at (207)287-2111.

#### Boating:

- Watercraft operators cannot pursue or harass wildlife.
- All watercraft must be kept at or under headway speed within 200 feet of shore.
- The operation of personal watercraft is prohibited on some Maine lakes and ponds.
- All motorized watercraft on inland waters must display a "Lake and River Protection Sticker".
- All vehicles and boat trailers traveling on public roads must be "weed-free".

#### Angling:

The sale of lead sinkers a half-ounce or less is banned in the state of Maine.

**Check with the Department of Inland Fisheries and Wildlife for more information.**

**MAINE**  
**AUDUBON**



Maine Audubon (207)781-2330  
www.maineaudubon.org  
Maine Department of Inland Fisheries and Wildlife  
(207)287-8000 www.mefishwildlife.com

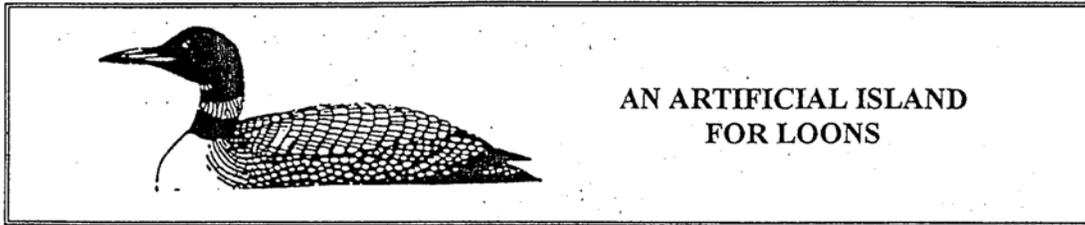
Printed with support from the Maine Outdoor Heritage Fund.

## Living in Loon Territory



**Some simple steps for living peacefully with our neighbors.**

### APPENDIX V. PLANS FOR ARTIFICIAL NESTING RAFTS



Loons will select the best nest sites they can find, sheltered from the prevailing winds and wave action. These sites may occur on the mainland side of an offshore island, at the edge of a cove in the lee of prevailing storms or upon an artificial island properly located.

But artificial nesting islands must accomplish what nature provides . . . suitable habitat!

#### Materials Needed:

4 or 5 6' X 8" cedar posts with bark off (untreated)  
1 5' X 5' piece of heavy turkey mesh wire fencing  
(galvanized, 2" X 4" mesh 12 12/2 ga.)  
16-20 8" galvanized spikes  
2 8 X 8 X 16 cement building blocks  
Heavy duty 1 1/2" fence staples (galvanized)  
4 cable clamps  
40' 3/16" wire cable anchor lines

#### Tools Needed:

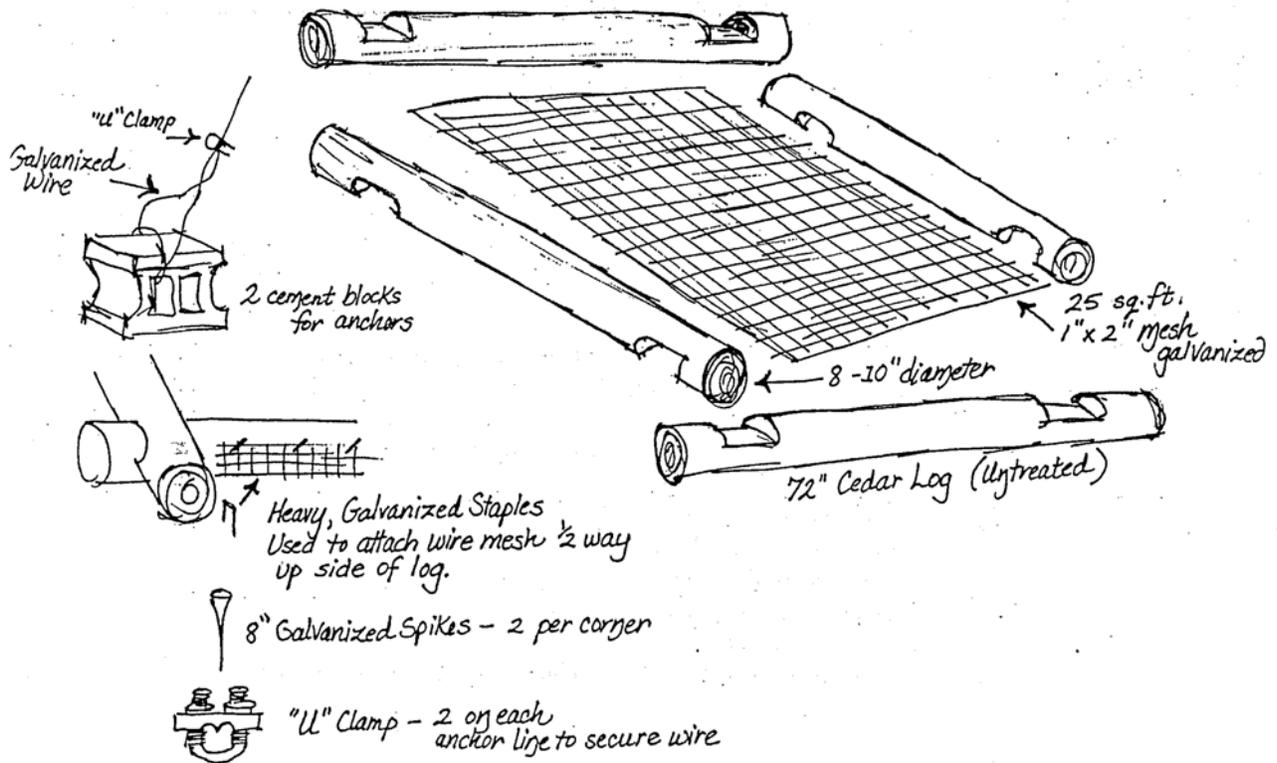
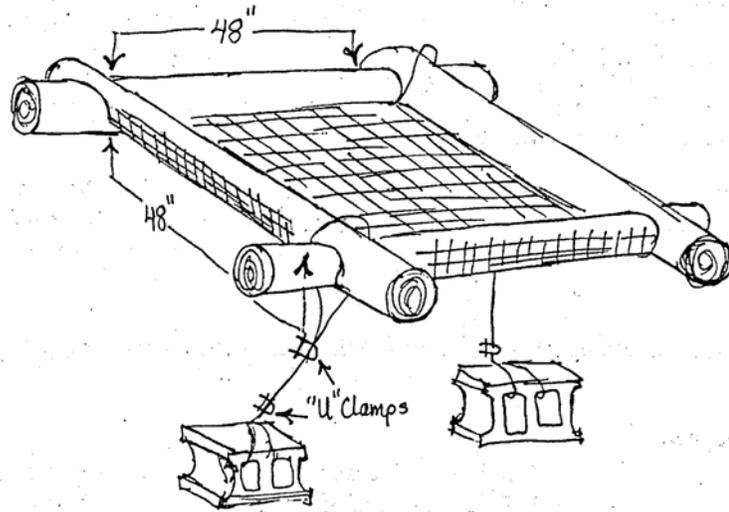
Chainsaw, bucksaw or power "skillsaw"  
Hatchet, adze or axe  
Carpenter's hammer  
Wire cutters  
Adjustable wrench

#### Actual Construction:

- 1) Notch cedar posts Lincoln log style and spike together to make a four-log frame. Add a fifth log across the center for extra buoyancy and rigidity.
- 2) Staple turkey mesh about every 4" to the bottoms of the logs wrapping it halfway up the sides from underneath.
- 3) Secure mesh all the way around the sides making sure there are no protrusions or "wild" wire ends which might injure a bird.
- 4) Attach anchor lines, one each to opposite corners (allow enough scope for water depth, usually about 20 ft. overall length) using 1 clamp on each line.
- 5) Attach one cement block to each line using the 2 other clamps.

# Appendices

## CONSTRUCTION



\* Be sure sharp ends of wire are hammered into the log.

## Appendices

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### Launching and Placement of the Island:

- 1) Place it in the water with the mesh side underslung.
- 2) Build up a heavy layer of sod, decayed wood or duff (for roots of plants to take hold in).
- 3) Then plant with indigenous vegetation—about 2 bushels—including ferns of all kinds, grasses, sedge mat, mosses, sheep laurel, blue flag iris, cattails, bullrush and other emergent vegetation.
- 4) Intersperse with at least 2 bushels of wetland-type debris for nest building.
- 5) If needed, provide a “natural” barrier to windward to prevent waves from washing over nest (spray is ok, but heavy wash will drive the bird and the nest away).
- 6) Excess loose material provided will enable the bird to add to its nest from time to time as compaction occurs.

BE VERY CAREFUL NOT TO OVERLOAD THE ISLAND CAUSING IT TO FLOAT TOO FAR DOWN IN THE WATER!

Then, as soon after ice out as possible:

- 7) Firmly anchor the island in water at least 4-6 ft. deep,
- 8) 30 - 50 yards from shore,
- 9) in a spot protected from prevailing winds and wave action, and
- 10) with a 45 degree angle to anchor lines (note they are slackened to allow for fluctuations in water levels).

### Protection Of Nests From Humans

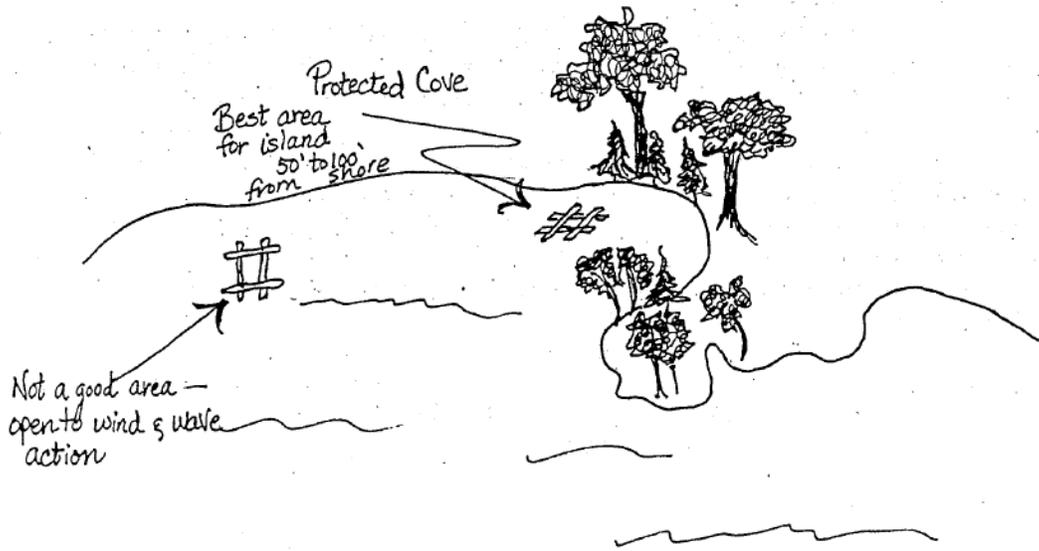
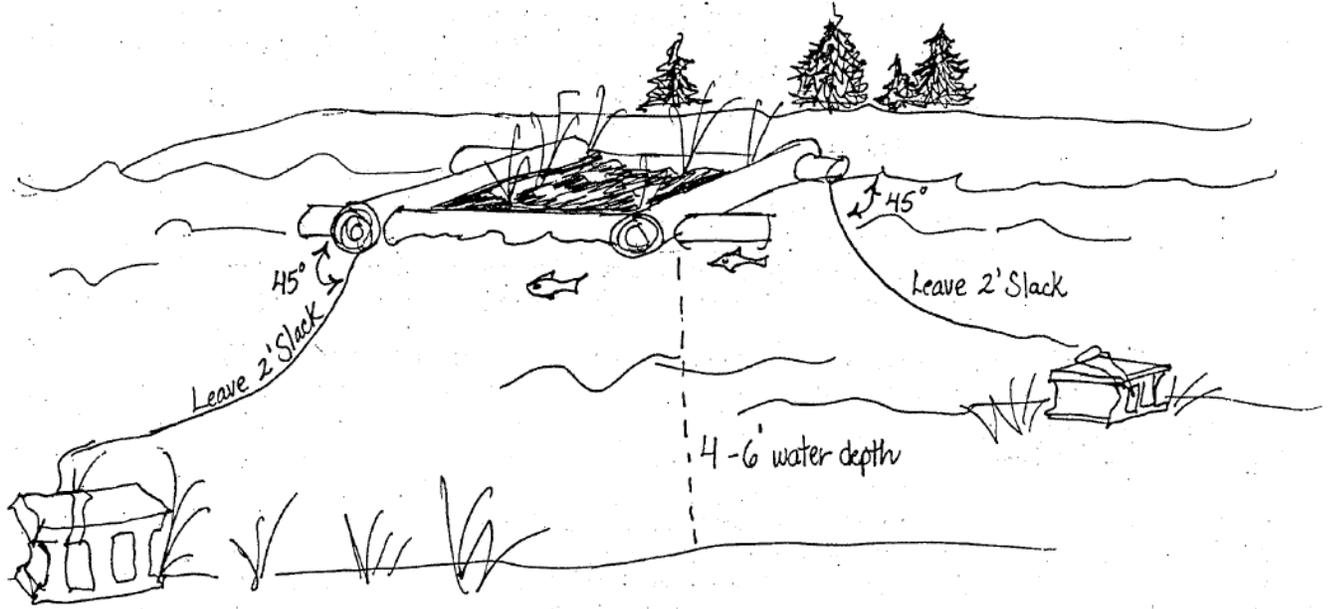
Human disturbance, a major threat to artificial island nests (all nests for that matter!), can be averted.

Educational posters, available from the Maine Audubon Society, should be placed at marinas, alongside launch sites, on town hall and supermarket bulletin boards, and in other obvious places. Floating warning signs may also be moored near approaches to nests.

On heavily travelled portions of lakes and ponds, actual patrol may be required to keep prospective loon parents from being scared off their nests. If frightened off a nest, the loon may not return until the intruder is gone, all the while leaving eggs susceptible to predation or fatal cooling.

# Appendices

## PLACEMENT



## Appendices

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### APPENDIX VI: LOON REFERENCES

(\* indicates inclusion in the curriculum supplemental box)

#### BOOKS

- \*Call of the Loon*, by David C. Evers & Kate M. Taylor  
Willow Creek Press. Minocqua, Wisconsin, 2006  
Stunning, full-color life history of the loon, including free DVD “*Loons, Lakes & Mist.*”
- \*Just Loons, A Wildlife Watchers’ Guide*, by Alan Hutchinson  
Willow Creek Press. Minocqua, Wisconsin, 2003  
Stunning photography and insightful natural history text, with its new and extraordinary audio component, remains the ultimate guide to finding, watching, and understanding loons.
- Loons of Tacoma Lakes*, by Sandra Lee Huston  
Penmor Lithographers, Inc, Lewiston, Maine, 2006  
Documentation of a pair of Maine Common Loons and their newly hatched chicks from July through October 2005.
- Loon Lake*, by Ron Hirschi  
Cobblehill Books. New York, NY, 1991.  
Exploration of wildlife on a northern lake geared towards young readers but with wonderful color photos that all ages will enjoy.
- Loon Magic (10<sup>th</sup> Edition)*, by Tom Klein  
Northword Press. 1996  
Loon lover’s bible available in soft cover. Detailed biology, behavior, and history of loons.
- \*Loon Magic for Kids*, by Tom Klein  
NorthWord Press. Minoqua, WI, 1991.  
Sensational photographs and text geared towards students.
- The Loon; Voice of the Wilderness*, by Joan Dunning  
Yankee Books, 1985  
Superb text describing life cycle of the loon, augmented with colorful and accurate drawings and watercolors.
- Love of Loons*, by Kate Crowley and Mike Link  
Voyageur Press. 1987  
Beautiful photographs and entertaining stories.
- The Common Loon: Spirit of Northern Lakes*, by Judith McIntyre  
University of Minnesota Press. Minneapolis, MI, 1988.

## Appendices

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Thorough account of loon behavior and biology via 20 years of study.

*The Uncommon Loon*, by Terry McEneaney

Northland Pub. 1991.

Emphasis on the physical appearance, annual life cycle and distribution of loons.

*Loon Legends*, by Corinne Dwyer

North Star, 1988.

*How the Loon Lost Her Voice*, by Anne Cameron

Harbour Publishing, Madiera Park, British Columbia, 1985.

Pacific-northwest Indian legend for ages 6 to adult.

*The Christmas Loon*, by Tom Martinson

Northword Press. Minocqua, WI, 1991

Story of one child's faith and concern for a wild creature.

*Keepers of Animals*, by Michael Caduto and Joseph Bruchac

Fulcrum. Golden, CO, 1997.

Native-American stories and wildlife activities for students.

### AUDIO/VIDEO

*Loons*, VHS tape

Peter Roberts Productions. Edmonds, WA, 1987.

Story of a Common Loon family from arrival at their traditional nesting site to the day the chicks are led away. Brief narration sets the stage, while the remainder is narration-free – wilderness sounds only.

\**Voices of the Loon*, CD

Swallowtail Records, 2007

Introduction to loon calls and identification.

Narrated by Robert J. Lurtsema.

### INTERNET LEARNING/RESOURCES

Common Loon: Journey North: <http://www.learner.org/jnorth/loon/>

Lessons, activities and information for the classroom.

Science on the Fly: <http://www.scienceonthefly.org/>

Teacher and student activities focused on loons, developed by BioDiversity's Adirondack Loon Center

Satellite Tracking website:

[http://www.umesc.usgs.gov/terrestrial/migratory\\_birds/loons/migrations.html](http://www.umesc.usgs.gov/terrestrial/migratory_birds/loons/migrations.html)

USGS interactive website with short videos of loon migration routes.

## **Appendices**

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### **APPENDIX VII: LOON AND LAKE ORGANIZATIONS AND AGENCIES**

Maine Loon Project  
Maine Audubon  
20 Gilsland Farm Rd.  
Falmouth, ME 04105-6009  
(207) 781-2330  
[www.maineaudubon.org](http://www.maineaudubon.org)

Vermont Loon Recovery Project  
Vermont Center for EcoStudies  
PO Box 420• Norwich, VT 05055  
(802) 649-1431  
[www.vtecostudies.org/](http://www.vtecostudies.org/)

Loon Preservation Committee  
Lee's Mills Road, PO Box 604  
Moultonborough, NH 03254  
(603) 476-LOON (5666)  
[www.loon.org](http://www.loon.org)

Wisconsin Project Loon Watch  
Sigurd Olson Environmental Institute  
Northland College  
Ashland, WI 54806  
(715) 682-1223  
[www.northland.edu/Northland/Soei/Programs/LoonWatch/](http://www.northland.edu/Northland/Soei/Programs/LoonWatch/)

Montana Loon Society  
P.O. Box 1131  
Seeley Lake, MT 59868  
[www.montanaloons.org/](http://www.montanaloons.org/)

Canadian Lakes Loon Survey  
Bird Studies Canada  
P.O. Box 160  
Port Rowan, Ontario, Canada N0E 1M0  
[www.bsc-eoc.org/ellsmain.html](http://www.bsc-eoc.org/ellsmain.html)

Maine Dept. of Inland Fisheries & Wildlife  
284 State Street  
41 State House Station  
Augusta, ME 04333-0041  
(207) 287-8000  
[www.maine.gov/ifw/index.html](http://www.maine.gov/ifw/index.html)

Maine Congress of Lake Associations  
P.O. Box 426  
Belgrade, ME 04917  
1-877-254-2511 (toll free in Maine)  
[www.mainecola.org/index.htm](http://www.mainecola.org/index.htm)

BioDiversity Research Institute  
19 Flaggy Meadow Rd.  
Gorham, ME 04038  
(207) 839-7600  
[www.briloon.org/](http://www.briloon.org/)

BioDiversity's Adirondack Center for Loon  
Conservation  
PO Box 195  
Ray Brook, NY 12977  
888-749-5666 ext. 145  
[www.briloon.org/science-and-conservation/centers/adirondackloons.php](http://www.briloon.org/science-and-conservation/centers/adirondackloons.php)

Maine Lakes Conservancy Institute  
Box 55  
Nobleboro, ME 04555  
(207) 563-LAKE (5253)  
[www.mlci.org/](http://www.mlci.org/)

Lakes Environmental Association  
230 Main Street  
Bridgton, ME 04009  
(207) 647 -8580  
[www.mainelakes.org/](http://www.mainelakes.org/)

Maine Volunteer Lake Monitoring Program  
24 Maple Hill Road  
Auburn, ME 04210  
(207) 783-7733  
[www.mainevolunteerlakemonitors.org](http://www.mainevolunteerlakemonitors.org)

Department of Environmental Protection  
Bureau of Land and Water Quality  
17 State House Station  
Augusta, Maine 04333-0017  
(207) 287-3901  
[www.maine.gov/dep/blwq/](http://www.maine.gov/dep/blwq/)