Grand Lake Meadows
A Provincially Significant Wetland
TEACHER KIT
Grade 4-5
Contents

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To the Teacher

Welcome to the Grand Lake Meadows Wetland Education Program for Grade 4-5. In this binder you will find paper copies of information contained on the accompanying CD. You will be able to use this binder to guide your class through the activities we have developed for this program. The CD contains all of the activity sheets so you are able to print and photocopy multiple copies for your students. We have also included information that will be useful in teaching your students about wetland areas in the Grand Lake region. The slide presentation can be shown to your students on a laptop/LCD projector system. Although this slide presentation was developed for older students the visuals will be exciting for younger students and will enable you to show your Grade 4-5 class some of the unique features of Grand Lake Meadows.

This program was developed through the Grand Lake Meadows Project Management Committee representing various non-government and government organizations concerned with wetland conservation in the area. For further information regarding this education program or wetland conservation issues in Grand Lake please contact:

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EVALUATION FORM

Please take a moment to fill in this evaluation form
Thank You

Return to: Todd Byers NBDNRE, Fish and Wildlife Branch, P.O. Box 6000, Fredericton, N.B. E3B 5H1. Fax: 453-6699

Teacher: ____________________________

School and grade level: ____________________________

Did you use the kit to deliver the program or did an instructor come to the school?


<table>
<thead>
<tr>
<th>Content and Instruction</th>
<th>Excellent</th>
<th>Above Average</th>
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Your Comments

(Include anything you would like to see added to this program)
Introduction and Learning Concepts:

The "Atlantic Canada Science Curriculum" identifies that at the Grade 4-5 level a component of science education should focus on developing a sense of responsibility for the environment and encouraging an interest in the natural world. The Grand Lake Meadows Wetland Education Program for Grade 4-5 students is designed to support the development of environmental responsibility in your students. By increasing the awareness in your students of the natural and cultural values of Grand Lake Meadows we hope to promote a "stewardship" attitude at a young age.

The common theme of "through the seasons" will demonstrate the natural and cultural values of Grand Lake Meadows throughout the year. Children at this age respond well to interactive visual and sensory experiences. The approach with this age group is to combine sensory experience with "storytelling". Prior to the written word, storytelling was an important part of communication and is still significant in aboriginal culture. This approach links natural history information with words to visually illustrate the connectivity between wetlands and humans.
Wetlands are one of the most bio-diverse habitats in the world, second only to rain forests in the number of species they support.

Wetlands are one of our most threatened ecosystems and conservation is critical to sustaining the health of our planet.

In New Brunswick we have lost over 50% of our freshwater wetlands and 65% of our salt marshes that were here prior to early European settlement.

Grand Lake Meadows has been designated a "Provincially Significant Wetland" by the New Brunswick government. This designation highlights the fact that Grand Lake Meadows is one of the most important pieces of freshwater wetland we have in the Province.
Wetlands are simply defined as "an area that is covered by water for all or part of the year".

Wetlands are also characterized by "hydric" soils which are soils that are continuously saturated with water. Wetlands are also characterized by aquatic plants that can tolerate continuously saturated conditions. Plants such as water lilies, cattails and willow and other wet ground species all indicate the presence of a wetland.
Grand Lake Meadows has been designated a Provincially Significant Wetland because it is the largest freshwater wetland complex in the Province making it one of the most important pieces of wildlife habitat we have. It is also one of the largest freshwater wetlands in the Maritimes.

The area is 3000 ha (7413 ac) in size. To put that into visual terms 3000 ha means that 5,674 football fields would fit into an area that size.
The area extends from McGowans Corner in the west and Fulton Island in the north, east to Jemseg and south to where the Jemseg and St. John rivers join.

The new bridge and piece of highway that crossed through the Meadows is highlighted by the pink dashed line.

Grand Lake is the largest in NB (18,135 ha; 44,810 ac) and because of its size acts as a heat sink that has a moderating influence on the climate of the region. The lake absorbs and stores heat in the summer and releases it in the fall. Consequently this region has one of the longest frost free periods in NB and some of the hottest summer temperatures.
Within the Meadows are a variety of wetland types

Shrub wetlands are the most common accounting for half of the wetland area in the complex. Shrub wetlands are dominated by shrubby vegetation such as sweet gale.

Permanently flooded emergent marsh accounts for 24% of wetland habitat at the site and is dominated by soft stemmed wetland plants such as sedges and buckbean.

Floodplain forest is also significant in the area (20%). This type of forest is fairly unique to NB. These areas are dominated by mature deciduous hardwoods such as silver maple, American elm and ash.

Grand Lake Meadows also contains seasonally flooded wetlands and numerous oxbows, sloughs and bogs that provide open water habitat.
Grand Lake Meadows has a number of important values and functions.

Natural values of the site include wildlife habitat and habitat for rare species.

The area also has historical significance. The Jemseg archaeological site is one of the most important archaeological finds in New Brunswick providing artifacts over 2000 years old. Traditionally the area has been used for subsistence purposes. First Nations camped in the area to hunt, fish and gather medicinal and food plants. European settlers also used the wetlands of Grand Lake to obtain food and fur for trade. Recreational opportunities for fishing, hunting and trapping are still an important value of the site.
One of the most important functions of Grand Lake Meadows is minimizing flood damage during the spring freshet. Most of the soils in Grand Lake Meadows are peat soils that act as a sponge soaking up excess flood water. The enormous size of this wetland complex combined with the water absorbing properties of the soils hold much of the excess spring flood water and release it slowly as the river recedes.

This sponge capability of wetland soils also helps improve water quality in the St. John River. As the water sits on top of wetland areas alluvial silts in the river deposit out of the water onto the wetland areas. In fact this silt deposition actually helps maintain high productivity in freshwater emergent marshes in the area. Wetland plants are also efficient at removing excess nutrients from water such as nitrates from agricultural run off. Thus wetland areas are important in maintaining water quality.
One of the most important values of Grand Lake Meadows is the wildlife habitat it provides throughout the year.

In the Spring, breeding waterfowl use the seasonal wetlands. The first species to arrive in the area include the black duck and common goldeneye. Canada Geese also use the site as a stopover during migration. These areas provide important invertebrate foods for breeding hens that need protein and calcium for egg laying. Amphibians such as spring peepers also use these seasonal areas.

Moose use shrubby hummocks close to the water to birth their calves. These hummocks provide safe birthing areas since predators such as coyote cannot travel to these sites.

The area also provides important spring spawning habitat for a number of fish species including perch, alewife and chain pickerel.
Grand Lake Meadows provides excellent breeding habitat for birds, amphibians, reptiles and mammals. Breeding waterfowl such as the wood duck are common. Other breeding waterfowl species in the area include ring-necked ducks, blue-winged teal, black ducks, mallards and common goldeneye.

Other marsh birds such as snipe nest in the area. Osprey nest in large snag trees are on artificial platforms and feed in open water areas. The amount of open water habitat in the area provides breeding sites for common loons. Species such as the belted kingfisher are found nesting in the floodplain forest area. There are also numerous songbirds nesting in floodplain forest habitat such as tree swallows and flycatchers. Owls and a number of hawk species such as the northern harrier are found in the region. Many amphibians such as bullfrogs and green frogs are found in permanent marsh areas. Several amphibian and reptile species such as the pickerel frog use pools in the floodplain forest.

There are numerous furbearers and small mammal species in the area ranging from little brown bat to coyote.
In the fall Grand Lake Meadows provides extremely important staging habitat for migrating waterfowl. Large numbers of scaup, ring-necked ducks, goldeneye and black ducks use the area to feed and rest during migration.

Moose feed on aquatic plants in late summer and early fall to provide them with important nutrients to build up fat reserves for the winter.

Furbearers such as raccoons, mink, muskrat, fox and coyote can be found in the area since there is abundant food available for these species in summer and fall.

Porcupines are common throughout the floodplain forest region at this time of the year and are often found feeding on bark of hardwood trees.
Grand Lake Meadows provides valuable wintering habitat for resident wildlife. The muskrat uses freshwater emergent marsh to build huts and store food for the winter.

The floodplain forest provides wintering habitat in the form of shelter and food to large mammals such as the moose and coyote.

Resident hawk and owl species such as the rough-legged hawk and great-horned owl will forage on small mammals such as snowshoe hare and deer mice.
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Grand Lake Meadows contains several rare species. The area supports a number of rare plants such as the buttonbush. Ash Swamp is the only known location in NB where false nettle can still be found.

The area is also significant for the number of rare species it supports. One of the most notable inhabitants is the Yellow Rail - Grand Lake Meadows supports the largest concentrations of yellow rail found in NB to date and is only one of a handful of sites where this species can be found in the Maritimes. The yellow rail is a shy secretive bird that is seldom seen but can be easily recognized by its distinctive call that sounds like two small pebbles clicking together.
From a natural perspective you have seen how the Meadows change over the seasons. These natural changes are also reflected in the cultural values of the site. In examining the cultural features of the area it soon becomes clear that Grand Lake Meadows was extremely important for subsistence. First Nation communities (Wolastoq'kew - People of the beautiful river) in the region gathered at locations around Grand Lake to fish, hunt and gather plants.

The first English trading post on the St. John River was established at the mouth of the Jemseg River in 1659. This trading post became the site of Fort Jemseg in 1667. Early French settlers abandoned the area in 1702 when the war between England and France was resumed. French Acadians returned to Maugerville in 1718 followed by English settlers in the late 1700's. Early use of the site for subsistence focused on the fur trade, agriculture later became important and agricultural land in this region is still prized for its fertility.

Fiddleheads are still an important spring food source. Gaspereau swim up the river in the Spring to spawning sites in the marshes and provide an important spring fishery.
Fishing of other species such as chain pickerel and eel has been a traditional activity in the region throughout the summer.

Black ash was once abundant throughout the floodplain forest and is still present today. This tree species was used by First Nations for their basket making industry. Ash was pounded into thin strips and woven into baskets.

Early records from Fort Jemseg identify egging as an important food source in the spring and summer. Waterfowl eggs, particularly Canada geese were collected by soldiers. Canada geese were also collected during their summer molt period when they were unable to fly.

Today the area provides important summer recreational opportunities for canoeists, kayakers, boaters, fishermen and birdwatchers.
One of the most important cultural activities occurring in the region during the fall is hunting. Both First Nations communities and European settlers depended on the fall hunt to provide much of their winter meat.

Waterfowl and moose were the primary focus of the fall hunt. Other species hunted in the region included deer and small game birds such as grouse.
One of the most important activities occurring in this region in the 1700's was the fur trade. Prior to agriculture the primary industry of the area was the fur market. Many people derived their living from this occupation. Furs were traded for goods and also brought direct economic benefits to the area. One of the most abundant furbearers trapped in the area was the muskrat. Other abundant species in old trapping records include, otter, mink, fox, bobcat and fisher.

Ice fishing for smelt, perch, and pickerel provided a winter food source. Ice fishing is still extremely popular in the region and Grand Lake provides some of the best ice-fishing opportunities in NB.
Although Grand Lake Meadows is important, unfortunately like all wetlands it is continuously threatened. One of the most controversial threats was the new highway and the construction of a new bridge and section of highway through Grand Lake Meadows. Concerns were based on environmental reasons such as habitat loss, siltation of fish habitat and impact on rare species. Substantial concerns were also raised about the impacts on the historical importance of the site, particularly the Jemseg archeological area.

Other threats include heavy boat traffic, forest harvest ATV use in marsh areas, agricultural development and recreational development (cottages).
A variety of organizations have been working together to ensure that Grand Lake Meadows is conserved. Much of the area has been purchased and secured under the Eastern Habitat Joint Venture. The Eastern Habitat Joint Venture is comprised of non-government and government organizations including NBDNRE, the Canadian Wildlife Service, Ducks Unlimited Canada, Wildlife Habitat Canada and the Nature Conservancy of Canada working together to further wetland conservation efforts in NB. Ducks Unlimited has a number of managed marshes in the area that provide permanent brood-rearing habitat for waterfowl. Ducks Unlimited also has a nest box program that provides alternate nesting habitat for wood ducks, common goldeneye and hooded merganser. The Province of NB has adopted a Wetlands Policy that will afford greater protective measures to wetlands.

Grand Lake Meadows is important to all of us and therefore we should all be concerned with wetland conservation in this region. From birdwatching to duck hunting the Meadows is a unique area where we can all enjoy interacting with nature.
Background:
At this age children have a natural curiosity about the world around them. We will make use of this natural curiosity to illustrate how wetland animals are adapted to their environment and to demonstrate the connection between nature and man.

This session provides Grade 4-5 students with information that will enable them to:

- Understand basic ways in which wetland organisms are related to their environments and to other organisms.

- Identify ways that people interact with wetlands and how wetland animals have played an important part in the history and culture of the Grand Lake area.

Preparation (15 min.):
Introduce the students to the concept of a wetland and explain the importance of Grand Lake Meadows from a natural and cultural perspective. Show or print copies of the slides and talking about the significant points associated with each picture (Slide presentation on CD).

After this brief introduction explain to the students that a significant amount of First Nation’s folklore is concerned with hunting and fishing activities and their religious beliefs centered on animal spirits. To illustrate this idea read the “Impounded Water” Tale.
Activity (30 min.):
After these readings bring the class together and have them sit in a circle. Within the circle you could place an artificial campfire (instructions provided in the back of this binder). Provide each student with a copy of the activity sheet depicting wetland wildlife found in Grand Lake Meadows. Then explain that you will be reading "stories" in poetry format and they must try and guess what you are portraying. Showing students items associated with the pictures (see resources) can further enhance this activity.

Wrap Up (15 min - could also be used as homework):
Then have the class return to their desks and provide them with a "wetland food chain sheet. Using their sheets ask the students to make a food chain for Grand Lake Meadows.

Extensions:
- Have the students write and illustrate a story about a particular wetland animal that has played an important part in the history of the Grand Lake area?

- Make a mural or mosaic showing wildlife in a complete wetland ecosystem.

- Read poems or stories about wildlife.

- View artwork or sculpture from different times that portray wildlife. What can you tell about the artist's attitude toward wildlife by looking at his/her work? What did the artist want to communicate about the animal?
How to make
An indoor
Flame effect camp fire

How to do it:
Cut ply wood as in diagram
This will create a carrying handle for the fires base.
Paint base green and leave to dry.
Once dry upturn flame effect lamp and place on centre of board
And trace around its base with a pencil. Put lamp to one side.

Lay two of the split logs on the top of the base each side of the
traced circle. From the underside of the board pilot drill four holes
and screw the split logs to the board. Screw the two remaining split
logs on top of the first two, leaving enough space in the middle for
the flame effect lamp to sit comfortably.

Take sheer material and trace upturned lamp onto centre of it.
Cut this hole out of material. Using glue gun, glue material around
top edge of flame effect lamp.

Nail twigs in a random conical pattern around the split logs
(Allow access for inserting lamp and replacing of bulbs).
Now is the time to trail the flicker effect lights around the base.
You can staple these into position. DO NOT STAPLE THROUGH Wires!
Place flame effect lamp into fire and tuck the material loosely over
Christmas lights to conceal them.

You will need:
Plywood ¾ “
Approx. 20" x 15"
1 log 12 “ long
Split long ways into four
10 Twigs 15” long
1 Flame effect lamp
P ‘able from Rossy’s
Approx $13 (discard conical base supplied)
1 String of flicker effect
Christmas lights (optional)
Available Canadian tire
Approx $10
A little Green Paint
Some sheer material 15”x15”
8 Wood Screws 2”
10 Nails 1.5”
10 Nails 1”

Tools:
Glue gun
Screw driver
Fret saw/ Jig saw
Hammer
Paint brush
Aglabem (a monstrous frog) kept back all the water in the world so that the rivers stopped flowing, and lakes dried up, and the people everywhere began dying of thirst. As a last resort, they sent a messenger to him to ask him to give the people water; but he refused and gave the messenger only a drink from the water in which he washed. But this was not enough to satisfy even the thirst of one. Then the people began complaining, some saying “I'm as dry as a fish”, “I'm as dry as a frog”, “I'm as dry as a turtle”, “I'm as dry as a beaver”, and the like, as they were on the verge of dying of thirst.

At last a great man was sent to Aglabem to beg him to release the water for the people. Aglabem refused, saying he needed it himself to lie in. Then the messenger felled a tree, so that it fell on top of the monster and killed him. The body of this tree became the main river (St. John River), and the branches became the tributary branches of the river, while the leaves became the ponds at the heads of these streams. As the waters flowed down to the villages of the people again, they plunged in to drink, and became transformed into the animals to which they had likened themselves when formerly complaining of their thirst.
Moose

From forest to marsh you will find me,
   I am an incredible sight to see.

   My hide was used by the Malicete,
   For making items for their feet.
Snowshoes were made with hide from my belly
   Wow this must have been a bit smelly!

From forest to marsh you will find me
   I am an incredible sight to see.

   Marsh plants fatten me so I stay strong,
   During those cold winters - Oh so long!
On an autumn night you will hear my voice,
   To have my young in the moss is my choice.

From forest to marsh you will find me,
   I am an incredible sight to see.
Ash

Leaves in pairs with one on top
In wet places they harvest my crop.

Raw bark from the mountain variety,
Was used to help pains in the belly.
Berries were made into herbal tea,
That kept away colds with Vitamin C!

Leaves in pairs with one on top
In wet places they harvest my crop.

The black kind was pounded into strips,
And woven into baskets with many a flip.
Wild animals eat me from berry to twig,
And I grow to be about 10 metres big.

Leaves in pairs with one on top
In wet places they harvest my crop.
Loon

You will hear my cry on a summer's night,
My striking feathers make me a beautiful sight.

I build my nest on a small quiet island,
I am an expert swimmer but very clumsy on land.
I lay two large eggs that are spotted and brown,
If you disturb us it makes biologists frown!

You will hear my cry on a summer's night,
My striking feathers make me a beautiful sight.

When my young ones hatch they often ride on my back,
It helps them rest and avoid a predator attack!
Pollution is really having a bad effect on our lives,
It makes a lot less food for us to find when we dive.

You will hear my cry on a summer's night,
My striking feathers make me a beautiful sight.
Porcupine

You would never know to look at me,
That I am related to the mouse and rat family!

I am very slow as I move about,
Be careful, don’t touch or you will shout!
Because I have special way to protect myself,
Only the fisher can attack me, no one else!

You would never know to look at me,
That I am related to the mouse and rat family!

You will find me in forest habitat,
Where I can find trees to make me fat.
Look for chewed twigs with bark all gone,
Scratch marks in snow from when I waddle along.

You would never know to look at me,
That I am related to the mouse and rat family!
Snipe

As you sit by the marsh on a summer night,
Look up in the sky and you will see a wonderful sight.

A small dark bird far up in the sky,
But then you will notice how he flies.
Swoops and spirals towards the ground,
Wind through his tail feathers makes an eerie sound.

As you sit by the marsh on a summer night,
Look up in the sky and you will see a wonderful sight.

He has a long narrow bill and a striped head,
A grassy marsh spot is made into a bed,
For the four pale brown eggs that are laid.
If you are lucky you will see them out for a wade.

As you sit by the marsh on a summer night,
Look up in the sky and you will see a wonderful sight.
Great-horned Owl

Big yellow eyes help me find my prey,
I am the biggest of my kind so they say!

I sleep in the day and hunt at night,
My thick feathers help with silent flight.
So I can easily swoop down on mammals and birds,
They don’t have a chance because I can’t be heard

Big yellow eyes help me find my prey,
I am the biggest of my kind so they say!

When I eat I often regurgitate,
That means throw up pieces of what I ate,
You will find these pellets lying on the ground,
And in them many bones and fur can be found.

Big yellow eyes help me find my prey,
I am the biggest of my kind so they say!
Spring Peeper

My call is one of the first signs of spring,
I am a cold-blooded animal known as an amphibian.

The X on my back will tell you for sure,
That I am this animal found along a wetland shore.
I make my noise with a sac under my throat,
That fills with air and is then pushed out.

My call is one of the first signs of spring,
I am a cold-blooded animal known as an amphibian.

We like to eat insects, spiders and worms,
If you ate such things I think you would squirm.
We lay hundreds of eggs attached to a twig,
We are very tiny - only 3 centimeters big!

My call is one of the first signs of spring,
I am a cold-blooded animal known as an amphibian.
Wood Duck

My beautiful colours really glow,
As I attract a mate with my flashy show.

We build our nest in a box or tree cavity,
That is a hole in a tree to you and me!
We can lay up to 15 eggs - white and round,
Sometimes our nest is very high above the ground!

My beautiful colours really glow,
As I attract a mate with my flashy show.

Once they are hatched and still very small,
The little ones jump out and to the ground they fall.
But don't you worry it doesn't hurt them a bit,
Because nature makes sure they have adapted to it.

My beautiful colours really glow,
As I attract a mate with my flashy show.
Muskrat

I am not the beaver you thought I am,
For I do not like to build a dam!

You will see my house sticking out of the marsh
Where I stay snug and warm during winters so harsh.
I build this hut with aquatic plants and mud,
And use other huts to store my food.

I am not the beaver you thought I am,
For I do not like to build a dam!

I am trapped for my thick waterproof fur
It will keep you warm when you go Brrr!
If you see my tail it is round and thick
I prefer marsh plants to a dry old stick!

I am not the beaver you thought I am,
For I do not like to build a dam!
Wetland Food Chain
Fill in the blank spaces with animal names