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Introduction

Theme:

*Through the Seasons*

As seasons change so do the wetlands of Grand Lake. At different times of the year these wetlands have particular natural values and functions. Human interactions with these wetlands are also closely tied to the seasons. This education program is designed to illustrate the natural values and functions of Grand Lake Meadows throughout the year in a manner that also illustrates the seasonal importance of these wetlands to humans. This approach demonstrates that Grand Lake Meadows is important for its unique ecological features and cultural significance.

Approaches and Learning Concepts:

*Grade 4-5*

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.
Grade 6-8
At this age students develop greater skills in abstract and creative thinking. They can also understand the interplay of environmental and human systems in greater depth. Learning can focus on investigating natural systems and engaging the students in discussion regarding connectivity between nature and humans. The approach concentrates on exploring wetland animal adaptations and biodiversity. This session also illustrates that wetland wildlife has played an important role in the history of the Grand Lake area.

Grade 9-12
In the senior years of school (Grade 9-12) students possess the skills to act as responsible citizens. An environmental education program can promote the "stewardship" concept, demonstrating to the students the value of wetlands to nature and humans. The approach with this age group is to provide students with biological information that gives them the background to understand the important functions and values of Grand Lake Meadows. Students at this age also thrive on debate and this approach is used to illustrate the many issues that surround wetland conservation and demonstrate that often we tend to forget about how closely we are connected to these natural places until they are threatened.
Introduction

Goal of the presentation is to introduce you to Grand Lake meadows and demonstrate why the area is such a significant wetland. Although we specifically focus on Grand Lake meadows it is important to realize that all wetlands are important and are a type of habitat that is continuously threatened.
When we talk about wetlands we are talking about an area that is covered by water for all or part of the year. Wetlands also have what we call "hydric" soils. These are soils that are continuously saturated with water. They also contain a unique group of plants that are adapted to living in these wet conditions.

Seasonal wetlands are just as important as permanent wetlands. In this region we have a great deal of seasonal wetland habitat in the spring. This seasonal habitat provides early season wetland habitat when larger more permanent wetlands are still ice covered.
Grand Lake Meadows has been designated a Provincially Significant Wetland by the New Brunswick Government. This designation means that the area is a particularly important wetland due to unique natural and cultural features.

Grand Lake Meadows is the largest freshwater wetland complex in NB and is also one of the largest freshwater wetlands in the Maritimes.
The area extends from McGowans Corner in the west and Fulton Island in the north, east to Jemseg an south to where the Jemseg and Saint John rivers join.

Indian Point
Ash Swamp
Jemseg Archeological Site

The lake is the largest in NB 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 (46%) - dominated by shrubby vegetation such as sweet gale.

Emergent marsh accounts for 24% of wetland habitat at the site and is dominated by soft stemmed wetland plants such as sedges, buckbean, arrowhead.

Floodplain forest accounts for 27% of the area and seasonally flooded agricultural land comprises 14% of the complex.
The area is valuable for a number of reasons that we will examine in more detail. You will see that in addition to being important for natural reasons the Meadows are equally important to us for cultural reasons. They have played an important part in our history and provide many resources for humans.
One of the most important functions of Grand Lake Meadows is minimizing flood damage during the spring freshet. The wetlands act like a sponge absorbing much of the excess water from the rivers, holding the water and releasing it slowly as the river receded. The flooding also plays a role in maintaining the fertility of these wetlands. As the water sits on top of the marsh silt deposits on the marsh bottom providing a flush of nutrients.
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. These area provide important invertebrate foods for breeding hens that need protein and calcium for egg laying. Amphibians such as spring peepers are also use these seasonal areas. Moose use shrubby hummocks in the marsh to birth their calves.
In the summer the area provides important brood rearing habitat for waterfowl. Other breeding birds such as the common snipe also use the marshes. Amphibians such as the bullfrog will also breed in the marshes.
The Meadows are an important area for staging waterfowl in the fall. Moose feed on aquatic plants in late summer and early fall to provide them with important nutrients that will help them build up fat reserves for the winter. Furbearers such as raccoons also use these wetlands for food.
In the winter the marsh becomes dormant. However, animals such as the muskrat use the marsh to build homes and store food for the winter. The forest provides cover and food for wintering wildlife such as deer.
The area is also significant for the number of rare species it supports. One of the most notable inhabitants is the Yellow Rail - this is the only known site in NB where the Yellow Rail is found.

Ash Swamp is the only known location in NB where false nettle can still be found.

The area also supports number of other rare plants such as the buttonbush.
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. The area is an important region for fiddleheads. Gaspereau swim up the river in the Spring to spawning sites in the marshes. These spring runs of fish have been an important food source for the Mi'kmaq. Today humans still fish gaspereau in the area.
Fishing of other species such as chain pickerel also occurs in the region throughout the summer. Black ash is used to make Mi'kmaq baskets and is harvested from the floodplain forest.
One of the most important cultural activities occurring in the region during the fall is hunting. Mi'kmaq used to hunt big game and waterfowl in the region and today hunting still occurs.
Although the marsh seems dormant in the winter a number of cultural activities still occur. Ice fishing is still popular. One of the most important industries in the area during the 1700's was the fur trade. Much of the history of the area is related to fur trapping and sales.
Although Grand Lake Meadows is important, unfortunately like all wetlands it is continuously threatened. One of the most controversial threats was the new highway. 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 and ATV's.
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. Ducks Unlimited Canada also has a number of impoundments in the area that provide permanent brood-rearing habitat for waterfowl. The Province is currently working on a Wetlands Policy that will afford greater protective measures to wetlands.
Grade 4-5
Tales from the Meadows

Introduction:

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.

Learning objectives:
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.
Format:

Introduction to Grand Lake Meadows
The instructor will introduce the students to the concept of wetland and introduce Grand Lake Meadows and explain how important this wetland is from a natural and cultural perspective (slides). Then the instructor will explain to the students that a significant amount of the Mi'kmaq folklore is concerned with hunting and fishing activities and their religious beliefs centered on animal spirits. Early European settlers were amazed by the richness of the land associated with the Saint John River and historical writings often focus on the abundance of the region. To illustrate this idea the instructor will read the following passages to the students:

The Origin of the Saint John River
The Impounded Water - A Malecite Tale
(Courtesy MacLloyd's Murias)

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.
From the book “The River St. John” by W.O. Raymond

Early descriptions (1700's) of the "interval lands in their virgin state, untouched by the white man's axe, serves to explain why these lands were not over-run by forest fires and were considered desirable by early settlers". "The trees are all extremely large and in general very tall"; "you may drive a cart and oxen through the trees". "Upon the interval land you have a long kind of grass which the cattle in the country fatten themselves upon". "Their hogs and sheep they keep on the islands, which are overflowed generally when the river breaks up which is commonly about the middle of April. This overflowing leaves these islands so rich that the hogs grow fat by eating ground nuts without any other food in the summer. The fish is the next thing. The river abounds with all sorts of fall fry, trout, salmon, bass, whitefish and sturgeon".

Activity
After these readings the instructor will then bring the class together and have them sit in a circle. Within the circle will be placed an artificial campfire. Each student will then receive a set of wetland picture cards depicting animals, or plants. The instructor will read a "story" (in poetry format) and play a particular sound or pass around an item. The students will then try and guess which item from their picture cards the instructor is portraying. They will indicate their answer by holding up their card.

Wrap Up
The instructor will then have the class return to their desks and the students will be provided with a "wetland web" sheet. The instructor will then lead the group in a discussion (using the picture cards) of how wetland organisms interact with each other and humans. Students will be asked to fill in the "wetland web" sheet.
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?
Poetry
Grade 4-5 Program

Poetry is being developed for this program that focuses on life history and cultural significance of plants and animals of Grand Lake Meadows. To facilitate understanding poetry is in simple form. Storytelling in the Mi'kmaq culture had a musical cadence. Thus, these poems are written in a style that resembles song lyrics. The poems are also designed to be fun since students at this age love humor.

Ultimately we will have a set of poems using animals/plants so that the first letter of each subject fits into Grand Lake Meadows i.e.

G Gaspereau
R River
A Alder
N Northern harrier
D Deer

L Loon
A Ash
K Kingfisher
E Ermine

M Moose
E Elm
A Atlantic salmon
D Dragonfly
O Otter
W Wood duck
S Snipe
Sample Poems

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.

River (Jemseg)
The Malicete call me by this special name,
Wolastoq gave them all of their game.

This name refers to a special place
I flow from the Meadows, a wetland space.
Indian Point and Jemseg - these are the names,
From when First Nations roamed my plains.

The Malicete call me by this special name,
Wolalstoq gave them all of their game.

Through the seasons I gave my gifts,
Fish were netted and fiddleheads picked.
Ash was used for making baskets and string,
In the fall Moose and fur I would bring.

The Malicete call me by this special name,
Wolastoq gave them all of their game.
GREAT HORNED OWL SKULL REPLICA.

#R-6228

Your Price - $98.95

Description

GREAT HORNED OWL SKULL REPLICA. Museum grade reproduction of one of the most common owls found in North America, Bubo virginianus. Strong beak, lightweight bone structure and fixed eye sockets are easily seen. Cast from polyurethane, this replica is more durable than a real specimen. Offers all the anatomical detail of a real owl skull without permit requirements for handling actual bone specimens. Size = 4" long x 2-1/2" wide x 2" high. One of many bird skulls offered by Acorn Naturalists. #R-6228. $98.95.

Quantity: 

Raccoon (medium sized female) track replica.

Your Price - $7.25

Description

Raccoon (medium sized female) track replica. #TR-3207. $7.25/ea

Please indicate quantity in the box below:

Quantity: 1

Add to Cart
Grade 6-8
Marsh Munchers!

Introduction

The students will be introduced to the concepts of adaptation and food chains to illustrate how wetland wildlife interact with their environment.

Learning Objectives:
This session provides Grade 6-8 students with information that will enable them to:

- Students will observe animal parts and write down what they think the animal eats and where it lives.
- Students will build a food chain/web based on the animal characteristics they have observed.
- Students will have a better understanding of how wetland animals are adapted to life in a wetland.
- Students will understand that all life in some way is connected to wetlands.
Format:
Students are provided with background information through slides.

1. Three tables are set up in the classroom with each table containing the following specimens.
   Table 1: Skull or claw replicas (duck, mink, raccoon, muskrat, great-horned owl, moose).
   Table 2: Pelts/feathers/specimens (duck wing, muskrat, pied-billed grebe, fish, dragonfly nymph).
   Table 3: Tracks (moose, grebe, duck, frog, owl or hawk, raccoon).

2. Students are split into 3 groups and each group is seated around a table. Each group is provided with a worksheet.

3. Each group has 10 minutes to examine their items and fill in the worksheet.

4. Each group then compiles their information and presents it to the class while showing the class their items.

5. The presenter then wraps up the session by going through the following discussion with the groups and asking them to fill in the food chain web as we go along. (Presenter will also be filling in the web on the board).
   Discussion:
   ➢ What is a food chain?
   ➢ The presenter will bring all the items to the front of the classroom and tell the students we are now going to go through the items (bringing together items that belong together such as the moose jaw and track). The questions the presenter will be asking are:
     - where does this animal fit into the food chain based on what we learned about its adaptations.
     - Is this animal connected in some way to a wetland? How?
Extensions

- Create a poster expressing opinions about wetland wildlife or wetland wildlife from Grand Lake Meadows.
- Write an essay on the role of wetlands and rivers in the region in the settlement of local communities.
Marsh Munchers!
Student Work Sheet
Table 1

For each specimen fill in the table below:

<table>
<thead>
<tr>
<th>What do you notice about the specimen you are looking at?</th>
<th>Number 1</th>
<th>Number 2</th>
<th>Number 3</th>
<th>Number 4</th>
<th>Number 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do you think this animal might eat?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What makes this animal different from the others on the table?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To tell the class...

We think animal 1 eats ___________ because ______________
We think animal 2 eats ___________ because ______________
We think animal 3 eats ___________ because ______________
We think animal 4 eats ___________ because ______________
We think animal 5 eats ___________ because ______________
Fill in the blank spaces with animal names
Introduction

Through the use of debating techniques students will be introduced to the complicated process of conserving wetland habitat and balancing conservation with human needs. They will also realize the significance of Grand Lake Meadows to the local region since the issue of a road through the meadows raises such anger in many local stakeholder groups.

Learning Objectives:
This session provides Grade 9-12 students with information that will enable them to:

- Understand the influence of individual and group actions on the environment and comprehend how groups can work together to balance interests.

- Understand cultural perspectives related to Grand lake Meadows.

- Understand the importance of exercising the rights of citizenship in conservation.
Format:

Background:

The students will receive the slide presentation first to provide them with the information they need to make informed decisions.

Activity:

Preparation
The instructor will explain that Grand Lake Meadows has been a hot topic in the news because of the controversy surrounding the installation of the new section of highway through Grand Lake Meadows. A variety of different organizations had various viewpoints in support of the new road or against it based on their attitudes to the area. It is important to realize that the Provincial Government and the wetland managers associated with the Province had to address these issues and try to balance the environmental concerns with the need for a new safe highway. The students will be provided with excerpts from the local papers regarding the issues and given 10 minutes to read them and write some brief notes.

Activity:
The students will be split into groups of four. Each group will represent a particular stakeholder. The instructor will explain that tonight there will be a public meeting in Gagetown and in attendance will be an environmental consultant hired by Muck and Rip Development Company (the company hired by the Province to build the new road). This consultant has been asked to prepare a report for the company and the Provincial Government that outlines concerns and provides recommendations to address these concerns. Each student group will then have 15 minutes to prepare their argument for or against the new road. Each group will assign a spokesperson to represent the individual mentioned on their card that will present their stakeholder concerns in a time frame of two minutes. The "environmental consultant" (instructor) will write the key issues on one side of a flip chart. As a group, the class will be asked to provide some possible solutions to concerns.
Wrap-Up
The instructor will tell the students that obviously from the preceding discussion we all have a connection to wetlands. Some of us may feel wetlands are not important but as a debate such as this illustrates wetlands have a variety of functions that are not recognized as being important until they become threatened. Concerns about wetland loss are significant in New Brunswick (reiterate wetland loss statistics). However, in the interest of economics and safety we also have a need for an updated highway. It is important that development is balanced with wetland conservation. Although, sometimes we cannot avoid habitat loss we do have mechanisms to offset this loss that may ultimately benefit wetland conservation. It is important that the public become involved in these issues. We all have a responsibility to become wetland "stewards" to ensure the future of areas such as Grand Lake Meadows.

Extensions

- Locate the watershed in which your school is located. What land uses are in the watershed? Are there any conflicts of uses, needs and wants?

- Prepare a species account for a wetland species that inhabits Grand Lake Meadows. Describe the life history, population date, and uses by humans.
Interest Groups

Mr. Hazen White - representing the local Jemseg Fish and Game Club
Mr. White represents the local hunting and trapping community who have serious concerns about the impact of the new highway on wildlife habitat in the area. Many of the members of the club derive direct economic benefits from trapping and guiding hunters. Some of the members are also concerned about the impacts of the highway on fish habitat.

Ms. Gail Sweet - representing the Marsh Monitors
Ms. Gail Sweet represents the Marsh Monitors a local environmental organization concerned with the impacts of the highway on the wetlands of Grand Lake. They are particularly concerned with the effects on rare species in the area and believe that when it comes to wetlands it is important to maintain the "no net loss" principle.

Mr. Gage Grimross - representing the Gagetown Historical Association
Mr. Grimross represents the local historical society that has concerns about the impact of the road on archaeological artifacts and the historical integrity of the area. They would prefer that all artifacts be preserved before the new road is constructed even though this could substantially delay the road construction.

Ms. Kat Kwapit' - representing the Wolastoq’kew community
Ms. Kat Kwapit' represents the local First Nations community. Elders within the community believe that the proposed road route will cross over an ancient burial site. The elders are adamant that this site not be disturbed. There is also a concern that ancient artifacts will be destroyed during the road construction process.

Mr. Chip Mann - representing the Roads R' Us Trucking Association
Mr. Mann represents the Roads R' Us trucking association that is dedicated to improving safety on NB highways. They have evidence indicating a high number of traffic accidents on the single lane highway from Jemseg to Fredericton due to the number of sharp turns in the
road. Their organization feels that the loss of wetland habitat is far outweighed by the number of lives saved with a safer 4-lane highway.

**Mr. Douglas Gilbert - representing local Government**

Mr. Gilbert is a local Town Councilor in Gagetown and feels the new highway construction will be an economic boon to his region. Local contractors have been guaranteed work on the highway construction and a number of jobs will be created for the region. All of the employees working on the highway in the area will be staying at bed and breakfast establishments in Gagetown. He also feels that a modern highway in New Brunswick will increase tourist traffic to the Province.
Two native campfires that may have burned long before Europeans ever set foot on these shores have brought construction of a segment of New Brunswick's new four-lane highway to a screeching halt.

A team of archeologists is now working in Grand Lake Meadows where the Maritime Road Development Corporation was in the process of building a bridge over the St. John River.

The construction crews were preparing the ground for the bridge's foundation when the company's on-site archeological monitor spotted an unusual color in the silt.

"I'm quite amazed. Darcy Digham has an incredible eye," says Sharon Pond, spokesperson for the corporation. "That brown smudge turned out to be a fire-pit.

All construction stopped immediately and the area was cordoned off.

That was Oct. 23 and the crew hasn't been able to get back to work since.

Over the next couple of days, archeologists found what they call a living floor.

"That's the level of ground that people would live on," says Colin Varley, the archeologist who has been contracted to manage the excavation. "It's recognizable because it's slightly darker-colored soil because of the charcoal and the regular debris of living.

"Most of what we're getting is stone-flakes which are the residue of making and sharpening tools. We've got a fair amount of pottery so far, which seems to indicate a minimum of three pots, maybe more.

Ironically, Dr. Varley believes the site used to be part of an ancient Maliseet highway - a resting place on a seasonal route where natives would come to fish, hunt water-fowl or harvest medicinal plants.

"It's not surprising to find this at all," he says. "The St. John River is a major, major river that would have served as a transportation highway. There are sites like these all over in these alluvial soils.

Dr. Varley thinks one hearth dates back 2,000 years and that the other hearth may be even older. But the team will be doing some carbon-dating to get a more accurate picture of how old things are.

Nobody can say for sure when highway construction can start again.

Now that the cold weather is here and the ground is starting to freeze, the digging is becoming more difficult.

But the archeologists may get around the cold by setting up a tent and bringing in a source of heat.

Ms. Pond says the corporation agreed in its contract that it would stop work should a site of historical significance...
be found. She says the company was prepared for such a discovery and she believes it will still be able to meet its deadlines.

"It's always difficult for us when we have to alter our work schedule. The project is on a very tight and ambitious schedule," says Ms. Pond. "But with some long hours and hard work, we can hopefully catch up. This isn't a major concern.

This is not the first time that highway construction in New Brunswick have intruded on historical native grounds.

In April of 1997, the Trans-Canada had to be re-routed over the Jemseg River - 250 metres to the south of its proposed point of crossing - because the area was suspected to be the site of an ancient burial ground.

See DIG, A2 DIG Continued from A1 The Jemseg site had been known to contain fragments of an ancient Maliseet civilization. Because of this, an archaeological dig took place as part of an Environmental Impact Assessment before highway construction could proceed.

Given only 10 months to finish their assessment - and hampered by poor relations with native people who felt they were not kept informed - archaeologists worked through the winter, using tents with insulated linings and covering the ground with straw to prevent frost from setting in.

In the end, red ochre - which has been found in other native burial grounds - was found at the bottom of the pit. The moment that happened, archaeologists stopped all work and notified everybody involved including chiefs, elders, politicians and officials.

Twelve days later the highway was re-routed. Since then, the Jemseg archaeological site has remained untouched and any artifacts found remain the property of Archaeological Services.
Environment will be safeguarded: consortium

DAVID STONEHOUSE
Telegraph Journal

Fredericton - The private consortium building the controversial toll highway between Moncton and Fredericton says it will spend several million dollars on environmental safeguards.

And $600,000 - half of it contributed by the government - will go directly to softening some of the blow to the Grand Lake Meadows, an internationally-known environmentally sensitive marsh area the highway goes right through.

The cash will be controlled by a committee that will include environmentalists and scholars and is to be funnelled to offset the "social or cultural impacts to the meadows."

"Really it is for enhancement of the wetland in some form," Environment Department official Linton Carr said when reached at his home last night.

He was reluctant to speculate what the money could be used for, but possibilities could include wetland awareness campaigns or an interpretive centre.

The route through the marsh is one of the most controversial aspects for environmentalists of the new 195-kilometre stretch from Fredericton to Moncton.

The government told bidders for the project it would match whatever money they would put up to cushion the some of destruction of 55 hectares the highway will go over. Maritime Road Development Corp. promised $300,000.

The Transportation Department also pledged, as part of the environmental approval for the highway, to buy up 360 hectares of wetland to compensate for the loss, Mr. Carr said.

To build the highway, fill five metres deep will have to cross the meadows to prevent the highway from flooding over in spring.

Environmental studies done for government showed the highway would not affect the water levels elsewhere in the marsh. But it will obviously cut a swath through wildlife habitat.

Amid the thousands of pages about the highway project released by the government yesterday were details of some of the private's consortium's plans and commitments to the environment.

Much of the plans were insisted on by the government. And the person who will oversee the $877-million project said he has never seen anything like it.

"It is probably the most unique document I have seen in my entire career," Maritime Road Development Corp. project manager Robert Nairn said in an interview yesterday.

"Now we are obviously going to follow it diligently, same thing with the quality management plan. Both of those
plans, in my opinion, far exceed any other project in North America.

The consortium's environmental manager says the plans will include follow up after the highway is long finished.

"We've budgeted several million dollars for the whole environmental project," Bob Hodgins said. "That includes everything from staff in the field to monitoring afterward.

The consortium has guaranteed a replacement water supply for homeowners along the new route. And it promises compensation to any harm to fisheries.

But officials don't expect fish habitat to suffer significant damage with the controls they are drawing up to prevent contamination or destruction.

"We don't anticipate any significant effect because we are going to time the construction at the period in their lifecycle - in the summer - when they're not in that area," Mr. Hodgins said from his office near Toronto. He moves to Fredericton next week to oversee the environmental safeguards for the four years of construction.

"We are designing the structures so it will allow for fish passage. This has all been worked out with the Department of Fisheries and Oceans," Mr. Hodgins said. "And we will have extensive erosion and sediment control plans in place so that we don't get sediment into the streams," he said.

"So all of these things are specifically being done to protect the fishery. So we don't anticipate - and certainly the province hasn't anticipated - a significant impact on any fishery.

"In particular, the salmon are the ones we are going to be especially diligent [about] in trying to put these measures in place.

The plans include safeguards to prevent springs and rivers from being contaminated - and the builders say they don't expect fisheries to be affected.

"The Fisheries Act requires that proponents compensate for loss of critical fish habitat," one plan filed as part of the contract says.

"The stream crossings will be developed following the principle of no-net loss of fish habitat and therefore agreements under the Fisheries Act are not expected to be the required.

"The Environmental Protection Act restricts the discharge of deleterious substances that may impact fish habitat," it says. "Contingency plans will be developed . . . should accidental discharge inadvertently occur.

The consortium also promises to test 40 sites where the highway crosses water as part of its fish monitoring plans.

"Each site will be monitored at least once per year starting in 1998 for at least 10 years past construction."

Illustration(s):

Project manager Robert Nairn says the environment plans exceed those for any project in North America.
Highway session draws crowd

Ascah, Adrienne

The information session at the Jemseg Lions Club Tuesday night had hardly begun, but there were already close to 100 people.

Residents of the Jemseg area came to hear more about the Fredericton-Moncton Highway project. Representatives from Maritime Road Development Corporation were on hand to answer questions and explain the diagrams of the new highway.

Sharon Pond, director of communications for the corporation, was happy with the turnout. But she wasn’t surprised.

"It isn’t unusual for people in rural communities to show greater interest in what’s going on in their community than you sometimes see in the city."

In the past few weeks, Pond and her colleagues have gone to the Village of Gagetown and New Maryland. During the summer, the corporation held information sessions in Moncton, Oromocto and Fredericton.

Many residents said they are looking forward to the new highway. Ian Varty, who lives in Cambridge Narrows, said the stretch of the Trans-Canada Highway he uses to travel to Fredericton leaves a lot to be desired.

"I’ve been here for six years, travelling into Fredericton, and I’ve had plenty of close calls with bad drivers. I guess the thought of a divided highway is pretty appealing to me."

Although Varty is looking forward to a smoother ride on the new highway, he said progress comes with a price.

"You lose a little bit of marshland and whatnot, but that’s the way it pretty much has to be, I think."

Bob Burdett, acting environmental manager for the highway project, said the corporation takes environmental concerns seriously. An extensive study was conducted before building began and precautions will take place every step of the way, he said.

Environmental protection is particularly important in the Jemseg area because of the Grand Lake Meadows, Burdett said. The meadows are an internationally recognized wetland area with rare plants.

The meadows are unique to the area, not seen in many places in the rest of Atlantic Canada and New England, he said.

"The wetlands are quite special. Then we come along and say we’re going to put a highway through it."

Burdett said the planning was a long and extensive process, but when it was decided the highway would be routed through the wetlands, it presented a challenge.

One concern was the flow of water and soil. They’re building an embankment out of rock to allow the free movement of water and putting "flow equalization culverts" through the embankments so water can drain...
evenly, he said.

Small animals can also use the culverts, so their movement won't be restricted, Burdett added.

During construction in the **Grand Lake Meadows**, machinery will re-fuel in two designated areas. These re-fueling stations are concrete pads with sumps to take care of any spills.

There will also be a high fence to contain the movement of the water when the spring floods come. That way, it will keep sediment coming off the construction from spreading into the meadows, he said.

The University of Moncton is helping the corporation monitor the impacts the construction may have on vegetation.

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Through the Seasons...

Grand Lake Meadows
A Provincially Significant Wetland
The Wetlands of Grand Lake

The Area

Grand Lake Meadows extends from McGowans Corner in the west and Fulton Island in the north, east to Jemseg and south to where the Jemseg and Saint John Rivers join. This wetland covers 3000 ha and is the largest freshwater wetland in New Brunswick. Due to the unique natural and cultural features of the area this site has been designated a "Provincially Significant Wetland".

Wetland Types

Most of the Grand Lake Meadows wetlands are classed as shrub wetlands (46%). There are also substantial amounts of emergent marsh (24%) wetlands. Small amounts of bog and swamp (flooded trees) also occur in the region.

Emergent marshes are characterized by grassy vegetation and a variety of soft-stemmed aquatic plants such as bulrushes and water lilies.

Shrub wetlands contain a large amount of "shrubby vegetation" such as sweet gale and short trees such as alders.
Did you know....
Grand Lake acts as a heat sink that has a significant moderating influence on the surrounding climate. Due to its large size 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 summer temperatures are some of the highest in the Province.

**Values and Functions**

Grand Lake Meadows is valuable to wildlife and humans alike.....

Humans have used this region for as far back as 6000 years. First Nations trapped, hunted and fished in the area. The region also provided medicinal and food plants. Today, fishing, hunting and trapping still occur. Fiddlehead picking provides important economic benefits. The area is also used extensively for recreational activities such as canoeing, boating and bird-watching.

**Take Care...**

Although the wetlands of Grand Lake provide important recreational opportunities, some activities can be detrimental to wetland habitat if care is not taken. When using motorized boats in the area please slow down since heavy wakes can flood out nests and destroy habitat. ATV use in the marsh can leave trails that take years to revegetate.
The wetlands of Grand Lake hold and absorb much of the spring freshet from the Saint John River. By acting as a sponge that soaks up the excess water and slowly releases it the wetlands help minimize flooding along the River. Many low-lying communities would experience substantial flood damage if it was not for the wetlands of the lower Saint John River.

Grand Lake Meadows is extremely important for wildlife. Waterfowl such as the black duck breed and raise their young in the marshes. In the fall large numbers of staging ducks such as scaup and goldeneye stop here to feed and rest during their migration. Numerous songbirds, hawks and owls breed in the region. The area also contains the only known colony of yellow rail in NB. Moose often use hummocks in the marsh for birthing their calves. In late summer aquatic vegetation helps moose build up fat reserves to get them through the winter. Muskrat breed in the marshes and the area provides spawning habitat for alewife, perch and chain pickerel.

The yellow rail is a small secretive wading bird that is rarely seen. They can be located at night by their distinctive call that sounds like two stones tapping together.
Conservation

A variety of conservation organizations have worked together to help secure the future of Grand Lake Meadows.

Eastern Habitat Joint Venture
The North American Waterfowl Management Plan (NAWMP) is a Cooperative agreement between Canada, The United States and Mexico to increase continental waterfowl populations. Under NAWMP a number of regional Joint Ventures have been established. The Eastern Habitat Joint Venture has the goal of Securing wetland habitat in Eastern Canada. Under the EHJV over 3000 ha of Grand Lake Meadows have been purchased and secured.

Ducks Unlimited Canada
Ducks Unlimited conserves, restores and manages wetland habitat. Ducks Unlimited has created 5 permanent wetlands in Grand Lake Meadows. Ducks Unlimited is a partner in the EHJV.

Provincial Government
The New Brunswick government is concerned about the loss of wetland habitat in the Province. The Province is working on a Wetland Policy that will inform the public about their position on wetland conservation.