This Booklet was Created by:

Danielle Owczarski
Summer 2006
4910 Biology Internship
for Johnson State College

The Creation of the Booklet was Sponsored by:

The Friends of Green River Reservoir
Vermont Forest, Parks, and Recreation

Booklet Photography:

Danielle Owczarski– all photos except listed
Jason Kelley– British Soldiers, Yellow Lady's Slipper, Porcupine, Red-breasted Merganser, White Trillium
James Deshler– Northern Spring Peeper

Special Thanks to the 2006 GRRSP Park Staff:

Jason Kelley– Park Ranger
Victor Veve
Tara Duffy

Contact Information

Green River Reservoir State Park
29 Sunset Drive, Suite 1
Morrisville, VT 05661-8331
Park Phone: (802-888-1349)
Season: May 26-October 9

The Friends of Green River Reservoir

Green River Reservoir State Park Interpretive Natural Field Guide

A Guide to Interactive Exploration

Ecological Concepts: Natural Communities, Water Resources, GRRSP Wildlife, Nutrient Cycling, and Conservation

Green River Reservoir State Park (GRRSP) was established in March of 1999. A **reservoir** can be a natural or artificial body of water used for storage or regulation of water. The land that the reservoir is located on was flooded in 1946 for flood control and to create a hydro-electric dam for the village of Morrisville, VT. Since then the area has become a special retreat for many people given its undeveloped primitive character and picturesque plant and wildlife.

The park land consists of around **5,110 acres** including the 653 acre reservoir. The 19-mile shoreline is the largest stretch of undeveloped shoreline in the state of Vermont. This is one of the many reasons people travel here to paddle, swim and camp.

In order to keep GRRSP in its present condition for future generations certain use guidelines must be followed:

- **Always** pick up your litter and any that has been left

How to Use this Booklet - The colored triangles correspond to sites located on the state park land and to the subject headings in this booklet. The guide is meant to provoke curiosity and promote responsible use of the nat-

Suggested Sites to Visit:

- Natural Communities
- Water Resources
- GRRSP Wildlife
- Nutrient Cycling

Northern Spring Peeper

Restoration and Rehabilitation

Before GRRSP was established, the treatment of the land was beginning to deteriorate. Sites along the shoreline were being trampled and litter was being left behind. Since then the park staff has been working hard to reverse the damage. They make the park guests aware of the pack in, pack out policy to keep the area clear of trash and close certain sites in order to rehabilitate and encourage the growth of vegetation that has been heavily trampled from campers and day users.

Degrading shoreline on Blueberry Island

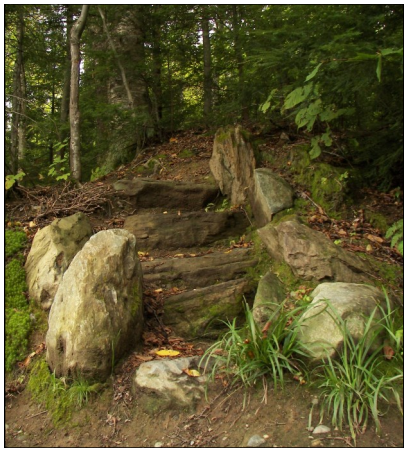
In 2004, the Vermont Youth Conservation Corp restored the trail out the "The Point" by building a stone staircase and reinforcing the trail in sensitive shoreline areas.

Conservation 101

- Educate yourself about natural resources and their importance to a healthy diverse planet
- Ask the staff what you can do to keep the park clean and in its primitive condition
- Be aware of your surroundings and be respectful to those around you
- Teach others what you know about protecting the environment
- Be active in your community by volunteering
- Learn about the endangered species in your state and what you can do to help

Activity:

Paddle to a camp site and observe the surroundings. What does the ground



Staircase for the trail to "The Point" that was built by the VYCC

Rose Pogonia Orchid found on the Intermediate Fen

Conservation

The purpose of conservation at GRRSP is to protect and manage the land and wildlife. **Conservation is important because it protects sensitive and diverse populations of plants and animals from being exploited or mistreated.** Conservation also includes protecting resources such as water and soil which create a healthy environment for all living organisms. People come to the park to enjoy and admire the beautiful flowers, trees, and animals. Just like us, they deserve a healthy and safe living environment. **There are many different ways the park works to do this.**

Land Management

The land that occupies GRRSP was purchased by the state of Vermont with help from the Nature Conservancy, the VT Housing and Conservation Board and the Forest Legacy Program. When the area was purchased **an agreement was made to protect the land** by creating regulations that protect the wildlife habitat and natural communities. The guidelines include:

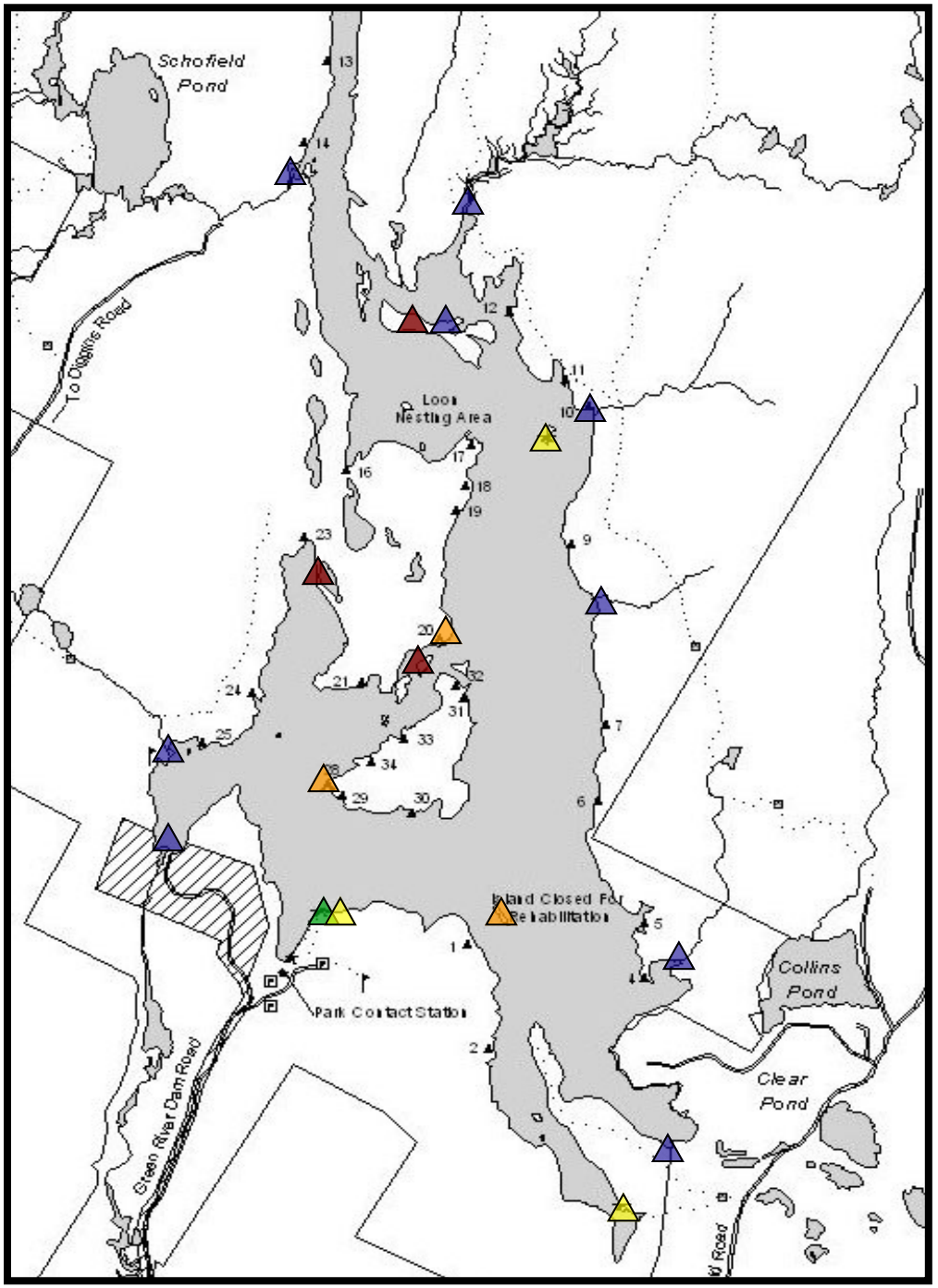
- Providing low-impact outdoor recreation to the public
- Conserving and protecting the property's primitive land for future generations
- Use of the land for educational, scientific, and natural area purposes
- No change to natural waterways, wetlands, and lakeshores

Common Loon Pair

Vermont Loon Recovery Project (VLRP)

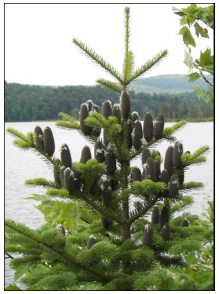
In 1987 the Common Loon was placed on Vermont's state endangered species list. On April 23, 2005 it was removed thanks to

Green River Reservoir State Park Map



- All photographs included in this booklet were taken


Red Maple Leaf


Balsam Fir Cones


Beech Leaf


Eastern Hemlock


Sugar Maple Leaf

▲ Natural Communities

The land that makes up Green River Reservoir State Park is home to many natural communities. A **natural community is made up of** numerous **organisms** such as plants, animals, and fungi, **their environment**, including wind, water and temperature, **and the relationship between them**. A natural community can be very complex.

Each member of the community has an important role to play. Trees provide shade for shade tolerant species of flowers. Moisture creates a desired habitat for most fungi. While soil and rock type support different kinds of plant and tree species. All of these examples create a habitat for many animals to make a home.

Each type of natural community has many of the same trees, herbs, and fungi, although **no community is exactly the same**. Each one you experience is unique. The concept of the natural community was created to help people recognize patterns and similarities in nature.

GRRSP has four examples of rare high quality natural communities. The quality refers to the size, condition, and landscape of the area. An example


Round-leaved sundew


White Trillium (April-May)


Pink Lady's Slipper (May-June)

Indian Pipe

During July on through to September is flowering time for the Indian Pipe. You may notice it sneaking up through the moist leafy ground at the reservoir or at your own home. Sometimes it is mistaken for a mushroom, but the Indian Pipe is a flowering plant. Unlike most plants the Indian Pipe does not have chlorophyll (the green color in plants). It cannot make its own food and needs to obtain nutrients elsewhere.


Indian Pipe

How Does It Make Food?

The Indian Pipe has a tricky relationship. It takes food from a tree and a fungus. It attaches to the fungus and steals the nutrients the fungus makes and the sugars and carbohydrates the fungus obtains from the tree. Therefore the fungus has to make more food. The Indian Pipe takes food, but does not share any food with either the tree or the fungus. This makes it a **parasite** of both.


Yellow Lady's Slipper Orchid

Flow of Nutrients: Tree Fungus Indian Pipe

Orchids

The most common orchid at the reservoir is the Pink Lady's Slipper, but there are at least 5 other orchids that live at the park. The Yellow Lady's Slipper looks similar to the Pink Lady's Slipper but is not as widespread at GRRSP. The tiny seeds of the Yellow Lady's Slipper do not have stored food to help them germinate. Instead, a fungus in the soil supplies food for the seed to germinate. The time it takes this orchid to flower can range from 15 to 17 years. This orchid is a shade loving plant.


British Soldier Lichen

Nutrient Cycling

Mushroom: The "flower" of fungus.

In order for plants, fungi, and lichens to grow they need nutrients. **Nutrients** can be anything that a living organism (including you) uses to grow and maintain itself such as carbon, sugar, amino acids, nitrogen or potassium. The nutrients are stored in the soil where the roots of a plant can reach them. When we eat a wild blueberry or any fruit or vegetable, we use the nutrients from the plants for energy to swim, paddle, and chop wood.

Nutrient cycling refers to the path a nutrient takes as it moves through the environment. For example, carbon dioxide from the air is used by plants in photosynthesis and when the plant dies and breaks down carbon is released back into the air and soil. The two main ways that nutrients are released into the soil are:

- Breakdown of mineral rich rocks
- Breakdown of **detritus** (decaying plants, animals, or feces)

These two forms of potential nutrients are broken down by water, bacteria, fungi, and small organisms that feed on detritus such as earthworms and millipedes.

Above and bottom left: New plant growth inside of dead trees

Mycorrhizae (my-co-rye-zay) is a funky term that describes a relationship crucial to the health of plants. Many plants have a special relationship with a fungus where a part of the mushroom's body penetrates into the roots of a plant. This is called a **mycorrhizal relationship**. The mushroom's rootlike hairs absorb nutrients that a plant makes from photosynthesis such as sugars and carbohydrates. In return the mushroom supplies the tree with

The **Northern Hardwood Forest** is an example of a *matrix* community on GRRSP. **Matrix** refers to a community that is widespread throughout an area with other smaller communities within it. If you follow your map to the green triangle you will discover a trail leading you through a N. Hardwood Forest to a northern point overlooking the reservoir. This type of forest covers 2,208 acres of park land.

Common Wood Sorrel (June-July)

While you travel the trail you may notice several species that make up the N. Hardwood Forest community. Sugar maple, beech, black cherry and yellow birch line the wooded side of the trail while eastern hemlock, balsam fir, and red spruce occupy the shoreline area of the trail. The latter three trees have the ability to grow well on areas of thin soil cover and rocky ground.

Dark-eyed Junco

Use the photographs on these pages to identify the common species that inhabit the N. Hardwood Forest community. Depending on the season you may see only a few of the

Bunchberry (May-June)

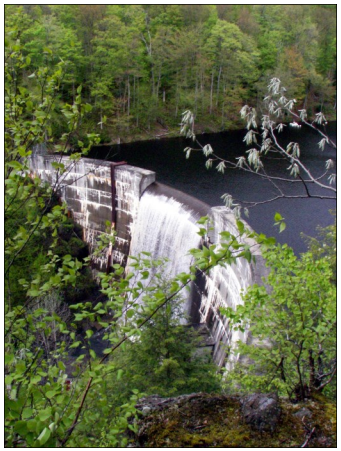
Activity:

Can you can recognize a northern hardwood community elsewhere on the reservoir? Notice the difference in plant growth and where the plants are located in reference to their surroundings. Try to detect a change in a community and make a guess as to why the community is different. Ex. Soils, climate, slope. Is it dry, sunny, or

Yellow Clintonia (May-June)

Goldthread (May-June)

Pipsissewa (July-August)

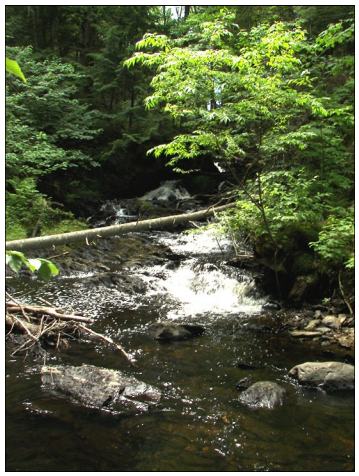

MW&L Hydroelectric Dam

Water Resources

Water plays many important roles in a society. It is crucial to the development of life by providing animals with drinking water and irrigation for food crops. Water is a large generator of electricity in the US and many other countries, generating around 20 percent of the world's electricity. By building dams people are able to harness power from water. Stored water

The **97 foot tall dam** located on the reservoir **has two turbines** that can generate up to 1700 kW each. This is enough electricity, per turbine, to light up 17,000, 100-watt light bulbs. The dam also doubles as a tool for flood control by keeping high levels of water from flooding lowland development such as houses, roads, and farms.

Water continuously renews itself via the **hydrologic cycle** . When water evaporates from the ocean it is swept across the land by wind currents in the form of clouds. As the temperature changes, the clouds form into heavy water droplets that fall from the sky onto the land where the water flows from streams and rivers into reser-


Feeder Stream by site 26

Building dams has advantages and disad-

Positive Effects	Negative Effects
Produces renewable energy for cities and towns	Floods large areas of land pushes out people and demolishes forests
Provides a place for fishing and recreation	Disruption of migration and reproduction of certain fish
Reduces the chance of flooding from heavy rain	High cost of construction
Stores water for irriga-	Possible cracks leading

Class: Amphibia (frogs and salamanders)
GRRSP Amphibians: Red-spotted newt, Wood Frog, Bullfrog, Green Frog, Pickerel Frog, Spotted Salamander, Toad

Common Traits:
- During the winter they burrow underground in mud, soil, or leaf litter where they remain inactive until spring
- Evolved from fish 300 million years ago
- Must live near water for part of the year

Class: Actinopterygii (ray-fanned fish)
GRRSP Fish: Small-mouth Bass, Perch, Northern Pike, Chain Pickerel, Pumpkinseed, Catfish

Common Traits:
- Includes more than 23,600 species
- Also called the modern bony fishes, they are the most common class but do not include sharks, rays, or sturgeons
- Fish breathe by taking in water and passing it through their gills which take oxygen out of the water


Small-mouth Bass


Admiral Butterfly


Eastern garter snake

Wildlife Tracking Tips:
1. Look for footprints in the mud or sand, heavily traveled trails (called runs) through unmarked areas, scat (poop), and chewed or marked vegetation.


Wood Frog


Porcupine


Common Merganser

Moose Track

GRRSP Wildlife

Whether you are camping, paddling, or hiking, wildlife is all around you. Check out these vertebrates!

Class: Mammalia
GRRSP Mammals: Moose, porcupine, shrews, jumping mice, black bear, beaver, river otter, mink, raccoon, snowshoe hare

Common Traits:

- Warm-blooded (maintain near-constant body temperature to survive cold and freezing weather conditions)
- Give birth to almost exclusively live young
- Have mammary glands that produce nourishing milk for offspring

Eastern Pheobe nest w/chicks

Class: Aves (birds)
GRRSP Birds: Great Blue Heron, American Robin, Common Loon, Red-breasted Merganser, Osprey, Hermit Thrush, Barred Owl, Yellow-Bellied Sapsucker, Pileated Woodpecker

Common Traits:

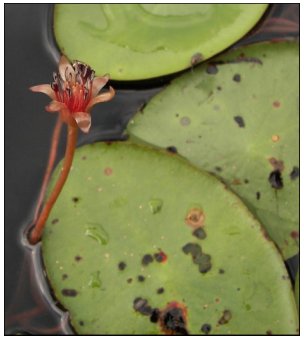
- Only animals that have feathers
- Have a keen sense of sight and hearing
- Evolved from reptiles who also lay eggs

Sapsucker holes in Eastern Hemlock bark

Deer scat

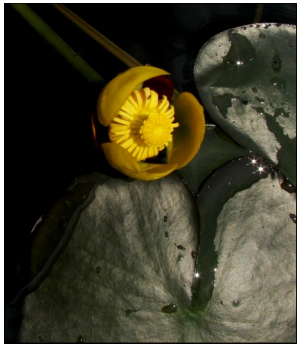
Beaver Hut

GRRSP is also a water resource for a vital type of low lying ecosystem called a wetland. Wetlands are crucial to many forms of life including human life. They help us by filtering dirty water, absorbing flood water, and preventing soil erosion. More importantly they are a breeding ground for many different species of plants and animals. The intermediate fen discussed earlier is an example of a wetland community.



Water-Shield (*Brasenia schreberi)*

GRRSP is home to fresh water wetlands in the form of bogs, marshes and swamps. The wetlands provide habitat for the northern spring peeper, salamanders and frogs, minks, beavers, snapping turtles, kingfishers (produces a rapid squirrel-like call), common loons, great blue herons, moose, osprey and the endangered bald eagle.



Bull-head Lily (*Nuphar lutea)*

The **blue triangles** on the GRRSP map page mark the dam, feeder streams and different types of wetlands found on the reservoir. The wetland communities you may see at the reservoir are the sedge meadow, home to the rare cloud sedge, the deep broadleaf marsh, home to water-shield and the bull-head lily, and the shallow emergent marsh which provides habitat for fish, beaver and a wide variety of wildlife. Using the photographs on this page see if you can identify some wet-

Blue Flag (*Iris versicolor)*

Pickerel Frog (*Rana palustris)*

Belted Kingfisher (*Ceryle alcyon*)