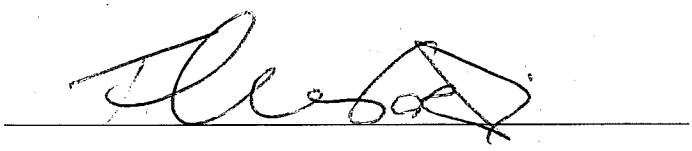
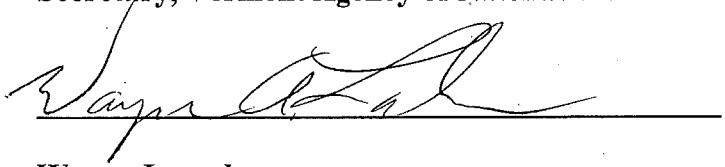
STATE OF VERMONT
AGENCY OF NATURAL RESOURCES
VERMONT FISH AND WILDLIFE DEPARTMENT

LAKE CHAMPLAIN ISLANDS WILDLIFE MANAGEMENT AREA LONG-RANGE MANAGEMENT PLAN

January 12, 2006



Tom Torti
Secretary, Vermont Agency of Natural Resources



Wayne Laroche
Commissioner, Vermont Fish and Wildlife Department

Vermont Fish and Wildlife Department

Lake Champlain Islands Long-Range Management Plan

Comments

Prepared by: _____
District Wildlife Biologist

District Review: _____
District Wildlife Biologist

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District Fisheries Biologist

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Forestry District Manager

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Lake Champlain Islands

Long-Range Management Plan

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I. INTRODUCTION

Overview of Wildlife Management Areas
Vermont Agency of Natural Resources

On behalf of the State of Vermont and the Agency of Natural Resources, the Department of Fish and Wildlife manages state-owned Wildlife Management Areas (WMAs) for a variety of purposes, ranging from the protection of important natural resources to public uses of the land in appropriate places.

Management and Administration of Wildlife Management Areas

The Department of Fish and Wildlife administers and manages Wildlife Management Areas throughout Vermont. The administration and management of WMAs is funded predominantly through the Federal Aid in Wildlife Restoration Program. This program was initiated in 1937 as the Federal Aid in Wildlife Restoration Act in which taxes are paid on firearms, ammunition and archery equipment by the public. Today this excise tax generates over a hundred million dollars each year that is dedicated to state wildlife restoration and management projects across the United States. These excise tax dollars, coupled with state hunting license fees have been the predominate sources of funding for the management of state Wildlife Management Areas.

Natural Resources include, but are not limited to: the land, air, and waters of the State of Vermont and those fish, wildlife, plants, other life forms, habitats, natural communities, and ecosystems within biophysical regions of Vermont.

Public Uses on Wildlife Management Areas include wildlife dependent activities, not limited to: hunting, fishing, trapping, hiking, wildlife viewing, research, and education.

Outcome of Long-Range Management Plans

The Vermont Agency of Natural Resources through its departments, manages state lands in a sustainable manner by considering all aspects of the ecosystem and all uses of the natural resources. (Agency Strategic Plan 2001-2005)

The Agency has a mandate to serve as the principal land steward for properties owned or managed by its three departments—Environmental Conservation; Fish and Wildlife; and Forests, Parks, and Recreation.

The development of long-range management plans (LRMP) for state lands represents a key step in providing responsible stewardship of these valued public assets. Each LRMP identifies areas where different uses are to be allowed and describes how these uses will be managed to ensure protection of natural resources. The following management considerations further both Agency and Department missions and are evaluated during the development of long-range management plans for all ANR lands:

Biological Diversity, Abundance, and Distribution: Wildlife Management Area lands are managed to maintain, restore, and control the variety (or diversity), number (or abundance), and distribution of plants, fish and wildlife, and other life forms within natural habitats, communities, ecosystems, and biophysical regions.

WMAs are managed to restore, maintain, and control the abundance of certain species of plants, fish and wildlife, and other life forms within bounds that prevent damage or loss of resource value that can result from: high or "over" abundance; low abundance or extirpation of species or genetic stocks; and frequent and/or large fluctuations in abundance through time.

Ecosystem Health: Management of Agency lands to control diversity, abundance, and distribution of plants, animals, and other life forms considers ecosystem functions, health, and integrity.

Legal Constraints: Agency lands are managed in accordance with the purposes for which they were acquired. Many Agency lands were purchased with federal funds that require management for specific purposes. These legal requirements are followed during planning, management, and public use of Agency lands.

Principles of Natural Resource Management: The procedure for making management decisions on Agency lands includes comprehensive survey and assessment of natural resources, and determination of management objectives, evaluation to determine appropriate actions and determination and implementation of various management practices. This procedure is repeated periodically in response to natural resource conditions and uses through time.

Principles of Wildlife Management: Wildlife management activities are directed toward managing the diversity, abundance, and distribution of plants, animals, and other life forms. These activities are designed either to sustain or alter physical, chemical, and/or biological conditions to create, protect, or enhance specific habitat types. Species, habitats, and ecosystems where there is special conservation or public concern, are targeted for management.

Recreational Uses and Needs: Wildlife Management Area lands are managed to create, maintain, and enhance fish and wildlife dependent activities that are consistent with legal constraints and that do not threaten the overall value and sustainability of the natural resources. Recreational uses that have been conducted on the properties prior to Department ownership, may be allowed to continue if they do not degrade the habitat or natural resources.

Wildlife Habitat Management: Management practices are used to ensure that trees, shrubs, and other plants are established, promulgated or controlled to establish and maintain the diversity, abundance, distribution, and seral successional patterns characteristic of a healthy forest ecosystem.

Wildlife Management Area lands are managed to provide for various habitat requirements for selected species. To obtain desired wildlife habitat age class and species composition, forested habitat may be managed using commercial timber sales or non commercial management. Revenues generated from any commercial timber sale go back into the management of Wildlife Management Areas. Wetland habitats may be manipulated through a variety of techniques for selected wetland water regimes or for various moist soil management regimes.

Public Involvement: State lands are a public resource. The public is involved in a variety of decisions on state lands, including acquisition, policy development, management planning, and the implementation of policies, plans, and regulations. In developing long-range plans, the Agency considers interests outlined in local, regional, and state plans, including town plans, regional plans, watershed plans, and species recovery and management plans. The Agency works to resolve conflicts between plans as may be appropriate or necessary.

Historical/Cultural and Scenic Values: Agency lands are managed in a manner that is sensitive to historical, cultural, and scenic values. Archaeological and historical sites are protected under State and Federal Law equal in status to other legal constraints.

Best Management Practices: A variety of Best or Acceptable Management Practices are applied to State lands. Agency lands are intended to serve as exemplary stewardship models for the public and private sectors of Vermont. Whenever possible, Best Management Practices are made visible and understandable to educate the public concerning their use and benefits.

Regional Availability of Resources and Activities: Department of Fish and Wildlife Wildlife Management Areas are managed for wildlife habitat values and to provide wildlife dependent activities (e.g. regulated hunting, fishing, trapping, wildlife viewing. The Agency works to ensure that additional uses and activities the public might desire (e.g. additional recreation, historical or cultural activities) are made available on a regional basis.

February, 2004

Mission Statements which have Guided the Development of this Plan

Vermont Agency of Natural Resources

The mission of the Agency of Natural Resources is "to protect, sustain, and enhance Vermont's natural resources, for the benefit of this and future generations." (Agency Strategic Plan, 2001-2005)

Four agency goals address the following:

- To promote the sustainable use of Vermont's natural resources;
- To protect and improve the health of Vermont's people and ecosystems;
- To promote sustainable outdoor recreation; and
- To operate efficiently and effectively to fulfill our mission.

Departments

Vermont Department of Environmental Conservation
Mission Statement - 2001-2005

To preserve, enhance, restore, and conserve Vermont's natural resources, and protect human health, for the benefit of this and future generations.

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Vermont Department of Fish and Wildlife
Mission Statement - 2001-2005

The mission of the Vermont Fish and Wildlife Department is the conservation of all species of fish, wildlife, and plants and their habitats for the people of Vermont. To accomplish this mission, the integrity, diversity, and vitality of their natural systems must be protected.

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Vermont Department of Forests, Parks and Recreation
Mission Statement - 2001-2005

The mission of the Department of Forests, Parks, and Recreation is to practice and encourage high quality stewardship of Vermont's environment by monitoring and maintaining the health, integrity, and diversity of important species, natural communities, and ecological processes; managing forests for sustainable use; providing and promoting opportunities for compatible outdoor recreation; and furnishing related information, education, and services.

II. PARCEL DESCRIPTION

There are a total of 71 islands in Lake Champlain, including New York, Vermont, and Quebec (Figure 1). Most of these islands are in private ownership. For the purpose of this planning document, the Lake Champlain Islands Wildlife Management Area (WMA) described in this document consists of 4 small and separate parcels owned by the Vermont Fish and Wildlife Department (VFWD). These parcels include Mud Island in the town of Panton, Addison County (less than one acre), Rock Island also in the town of Panton (less than one acre), Sloop Island in the town of Charlotte, Chittenden County (less than one acre), and South Sister Island (also known as Young Island) in the town of Grand Isle, Grand Isle County (5.5 acres).

Rock Island

This island is located in the town of Panton approximately ½ mile southwest of Arnold Bay in Lake Champlain (Figure 2A). The island is a perched, flat-topped island, less than one acre in size. It has an elevation of about 20' above the average summer lake level. The north, west, and south sides of the island are steep rock outcrops. On the central part of the east side, there is a small cobblestone beach and an exposed sandface resting upon the rock foundation. The overstory vegetation is scattered red oak trees over a patchy understory of grasses and shrubs. The island is important for waterfowl during their nesting and migration periods. Many other nongame bird species also use the island for nesting. This island is often confused with another island named Rock Island found in the town of St. Albans on Lake Champlain. That island is not owned by VFWD.

Mud Island

This small island is located in the town of Panton approximately one mile southeast of Rock Island (Figure 2A). This island is low and rocky and less than one acre in size. The size and configuration of the island varies seasonally and between years depending on water level. There is a scattered overstory of green ash and American basswood trees and a light understory of shrubs such as willow and non-native honeysuckle. It is an important area for nesting waterfowl and other nongame birds including several shorebird species such as Bonapart's gulls, spotted sandpiper, killdeer, and ruddy turnstone.

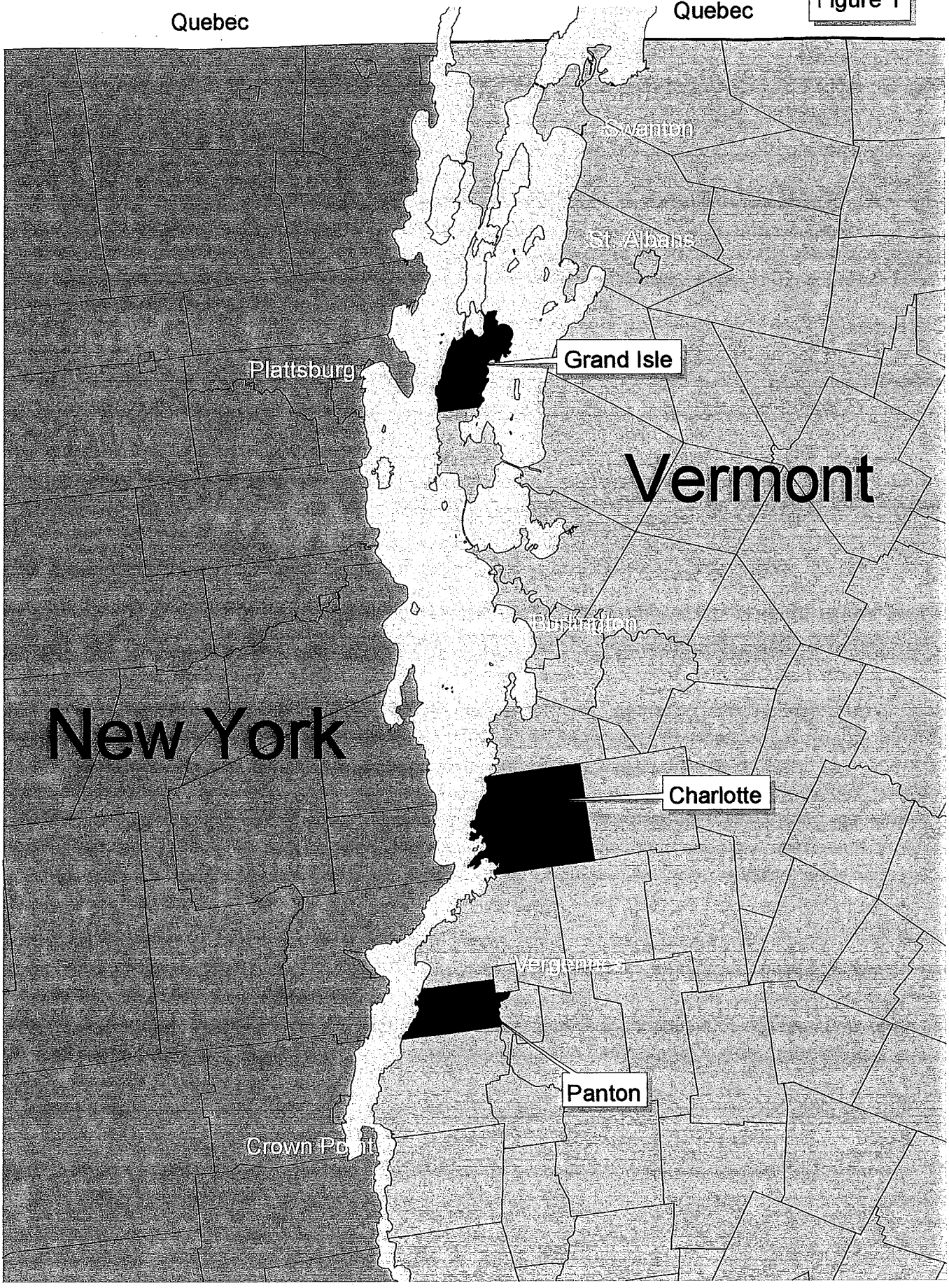
Sloop Island

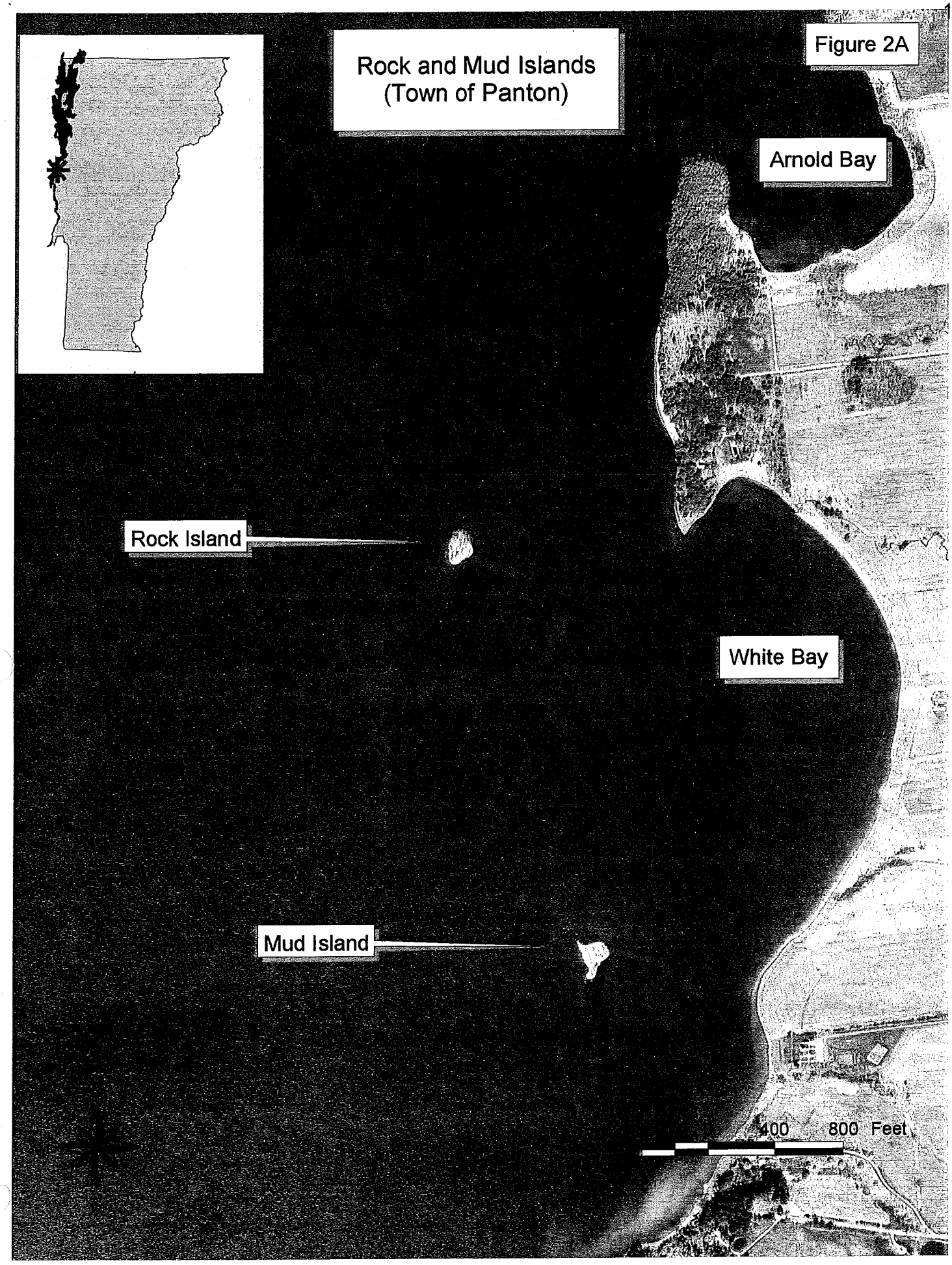
This island is located in the town of Charlotte about 1 ¼ miles northwest of Converse Bay (Figure 2B). The island is less than one acre in size and has a scattered overstory of green ash and American basswood trees and an understory of dense honeysuckle shrubs. It is an important area for nesting birds and also for shorebirds and waterfowl during migration.

South Sister Island

Also known as Young Island, this parcel is about 5.5 acres in size and is located 0.6 miles from the west shore of the town of Grand Isle (Figure 2C). The island's vegetation at the time of acquisition in 1959 was similar to that currently found on Bixby Island, about 0.4 miles to the north. This island may be used as a reference site for habitat restoration purposes. The hardwood forest known to exist on South Sister Island was dominated by eastern cottonwood, green ash, American elm, basswood, and silver maple. Understory plants included raspberry, blackberry, staghorn sumac, Virginia creeper,

Figure 1


Quebec
Quebec
Swanton
St. Albans
Grand Isle
Plattsburg
Vermont
Burlington
New York
Charlotte
Panton
Crown Point


Rock and Mud Islands
(Town of Panton)
Figure 2A
Arnold Bay
Rock Island
White Bay
Mud Island
400
800 Feet

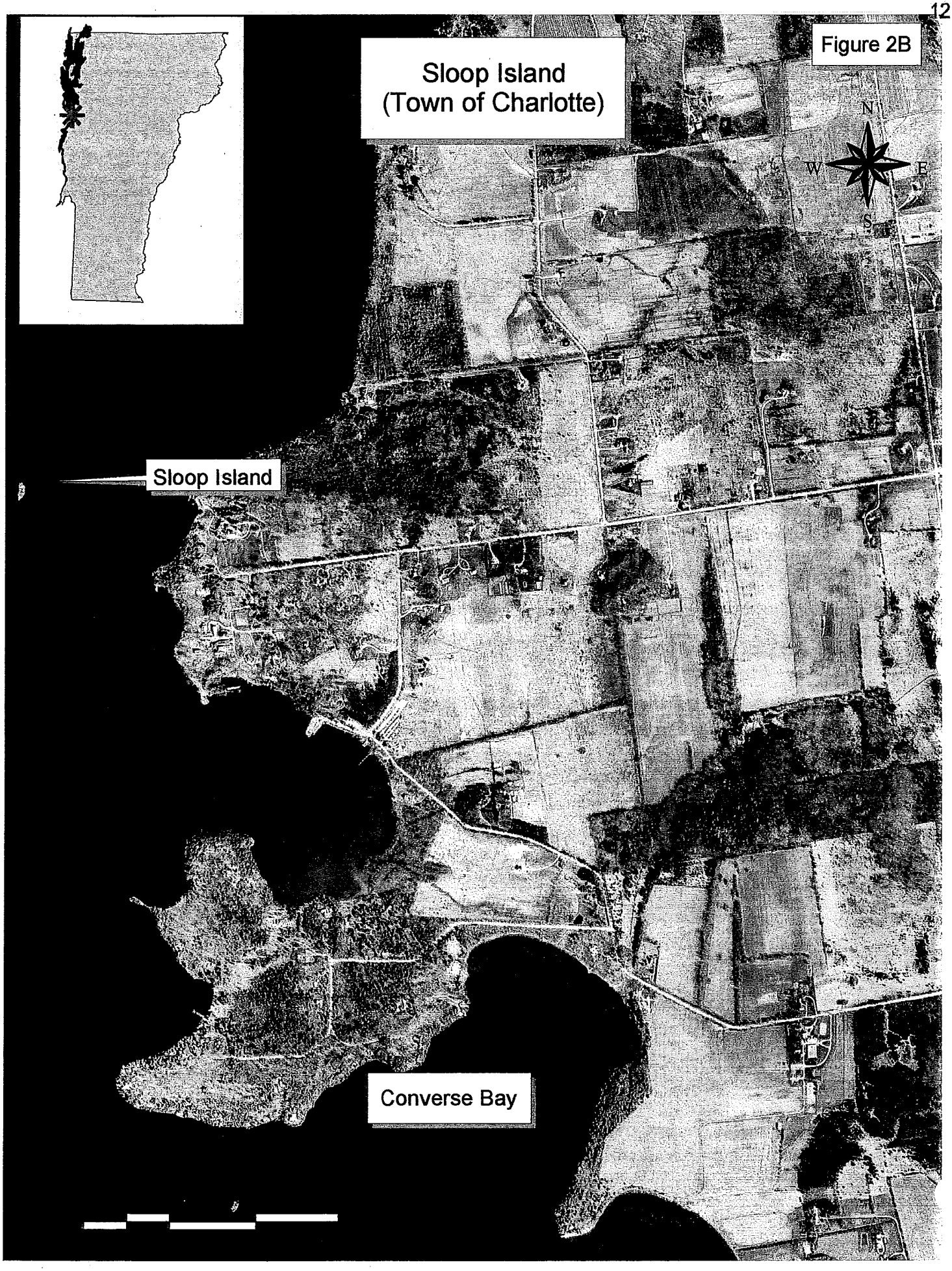


Figure 2B
Sloop Island
(Town of Charlotte)
N
W
E
S
Sloop Island
Converse Bay

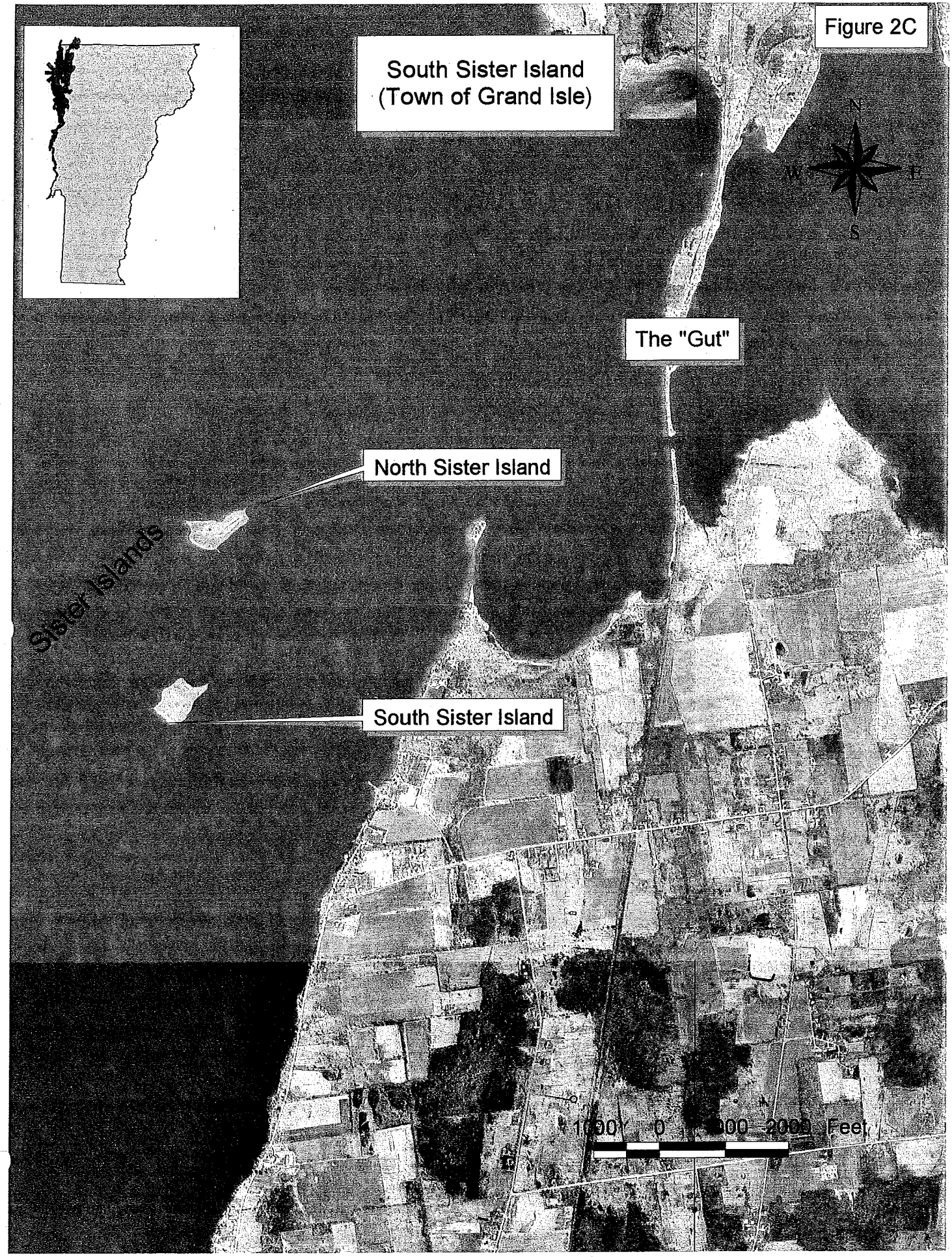


Figure 2C
South Sister Island
(Town of Grand Isle)
N
W
E
S
The "Gut"
North Sister Island
Sister Islands
South Sister Island
1000' 0 1000 2000 Feet

wild grape, and dogwood. Herbaceous plants included several grasses, nettles, bedstraw, wild mustard, mallow, and trillium (Coulter and Miller 1968). This vegetation has been completely lost due to the effects of nesting colonies of waterbirds (especially double-crested cormorants and ring-billed gulls) that first arrived in the mid-1950s. As a result, the current island vegetation consists of a few widely scattered and stunted cottonwoods, box elder, and green ash. Widely scattered shrubs include elderberry. Weedy, non-native herbaceous plants such as stinging nettle and pigweed now dominate the island vegetation. There are large patches of exposed ground where the guano has killed all vegetation and bird guano now covers much of the island's surface. As a result of the damage to the vegetation, most of the former bird diversity has been lost. A narrow cobble beach interspersed with occasional ledge outcrops surrounds the island's perimeter. This area is still used by shorebirds during migration for feeding and loafing.

Location

The Lake Champlain Islands are situated within the Champlain Valley Biophysical Region (Figure 3). The climate in the region is mild and dry relative to other more mountainous parts of Vermont. It has a longer growing season and less severe temperature fluctuations than other regions due to the effect of Lake Champlain. The Champlain Valley has some of the oldest geological formations in the state. After the retreat of the last glacier 13,500 years ago, the Champlain Valley filled with freshwater and was known as Glacial Lake Vermont. At a later point seawater filled the valley from the St. Lawrence Valley and the Champlain Sea was formed. Evidence of these events can be found in the fossilized coral and shellfish seen in local limestone deposits. Soils within the region were heavily influenced by the inundation by seawater and by the glacial outflow from several major rivers that entered the Lake Champlain Valley. Soils vary from the valley clays found in Addison County to the sandy soils near the mouths of the Lamoille and Winooski Rivers, to the coarse upland glacial tills found throughout the region.

Acquisition History

Most of the islands in Lake Champlain are privately owned. VFWD began acquiring islands in Lake Champlain in the 1950s as areas to provide waterfowl habitat and hunting opportunities.

Rock Island

This parcel was acquired in 1998 with funding from the Lake Champlain Land Trust and the Vermont Housing and Conservation Board.

Mud Island

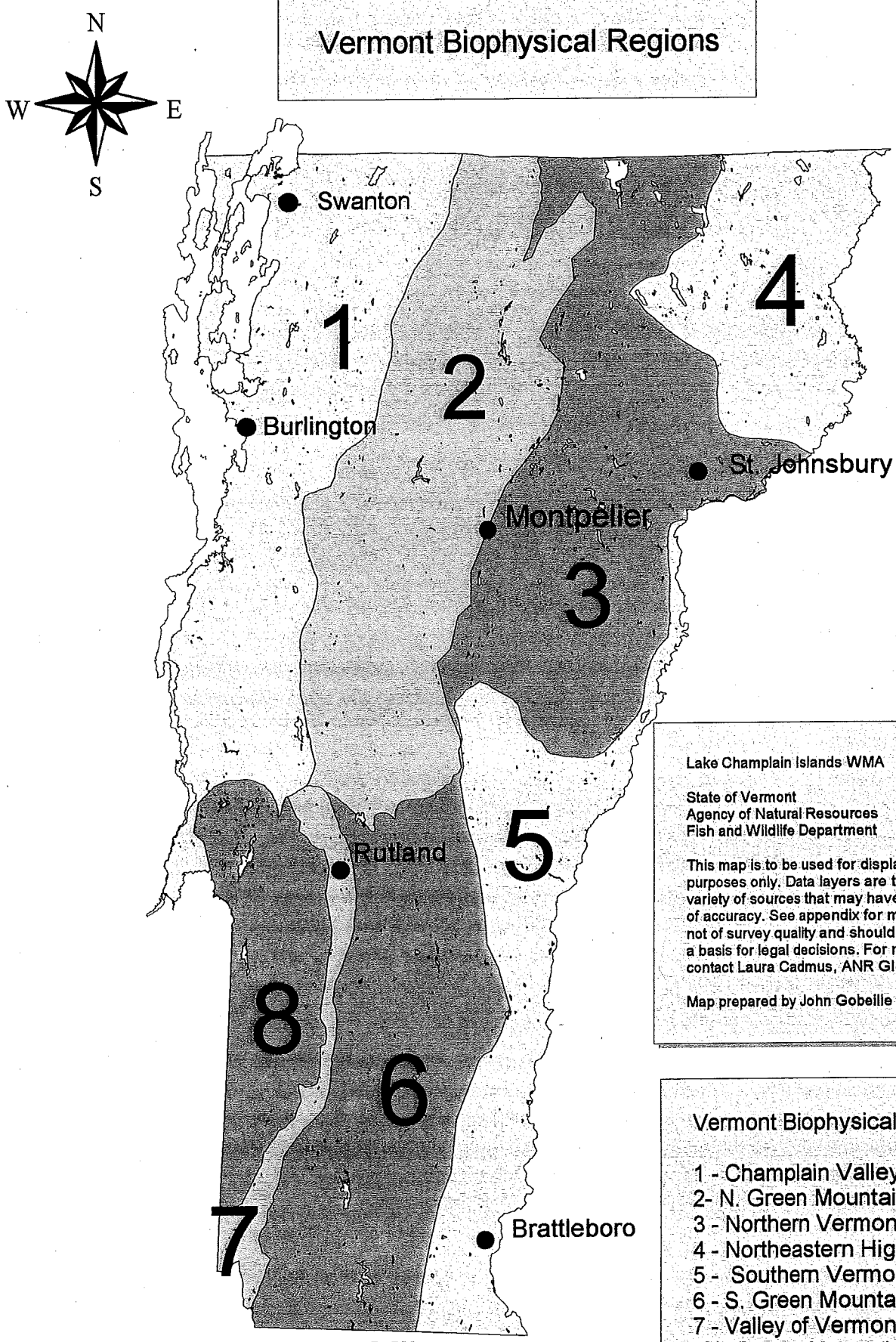
Mud Island was acquired in 1994 from Nancy Redpath, the former owner, with funding from VFWD's Waterfowl Stamp Fund and a grant from Ducks Unlimited.

Sloop Island

This island was acquired in 1977 with the assistance of The Nature Conservancy.

Figure 3

Vermont Biophysical Regions



Lake Champlain Islands WMA

State of Vermont
Agency of Natural Resources
Fish and Wildlife Department

This map is to be used for display or planning purposes only. Data layers are taken from a variety of sources that may have varying degrees of accuracy. See appendix for metadata. Data not of survey quality and should not be used as a basis for legal decisions. For more information contact Laura Cadmus, ANR GIS coordinator.

Map prepared by John Gobeille 1/23/05

Vermont Biophysical Regions

1 - Champlain Valley
2- N. Green Mountains
3 - Northern Vermont Piedmont
4 - Northeastern Highlands
5 - Southern Vermont Piedmont
6 - S. Green Mountains
7 - Valley of Vermont
8 - Taconic Mountains

South Sister Island

This island was purchased by the state of Vermont on December 30, 1959 from Charles and Helen Rust. The state-owned Vantines fishing access is on the nearby west shore of Grand Isle and came with the purchase.

Purpose of Ownership

The purpose of ownership by VFWD is to protect and enhance wildlife habitat and natural communities, to preserve cultural resources, and to provide public access for hunting, fishing, trapping, hiking, and other non-commercial activities, as described in the VFWD Strategic Plan (2005).

Resource Conservation

Goal A: Conserve, enhance, and restore the ecological integrity of Vermont's natural communities and habitats and the ecological processes that sustain them.

Recreation

Goal B: Provide a diversity of safe and ethical fish and wildlife-based activities and opportunities that allow, hunting, fishing and trapping and ethical viewing, and utilization of fish, plants, and wildlife resources consistent with the North American Model of fish and wildlife conservation.

Land Use History

The smaller Lake Champlain islands (< 1000 acres) do not have a well recorded history as do the larger islands (i.e. South Hero, Isle La Motte) and in the mainland towns along the shores of Lake Champlain. However, archeological evidence and oral history among the Abenaki and Iroquois indicates that native Americans commonly used the islands for hunting, fishing, plant gathering, and for winter encampments. Large winter encampments by the Abenaki are known to have existed in areas of South Hero, for example. Smaller islands may have been used for waterfowl hunting and for ceremonial purposes such as Rock Dunder near present day Burlington. Several of the lake's islands also figured prominently in the battles of the French and Indian War, the American Revolution, and the War of 1812. Once wars ended, settlement began in earnest, and Euro-American settlers used the smaller islands of Lake Champlain for sheep grazing in the early 19th century. This likely denuded the islands of their vegetation as did the majority of Vermont's land base. Some of the larger islands became small resort communities during the late 1800s (Albers 2000). Smaller islands have had camps or summer homes built on them by their previous owners such as found on South Sister Island. Some of these camps have long been abandoned and are now in complete disrepair.

The current land use is primarily recreational by the public. Anglers frequently fish on and around these islands while canoeists and kayakers also use the area. Birdwatchers visit the islands as they are attractive to many bird species. Waterfowl hunters use the islands in the fall and one can often spot duck blinds along their shores.

Legal Constraints

The following legal constraints apply to the islands as specifically stated for each:

Rock Island

Development rights are held by the Lake Champlain Islands Trust, Lake Champlain Land Trust, and Vermont Housing and Conservation Board.

Mud Island

There are no easements, encumbrances, or restrictions on the property. All land is held in fee by the State of Vermont.

Sloop Island

There are no easements, encumbrances, or restrictions on the property. All land is held in fee by the State of Vermont.

South Sister Island

There are no easements, encumbrances, or restrictions on the property. All land is held in fee by the State of Vermont.

Summary of Resource Highlights

- Important nesting habitat for waterfowl and other nongame birds
- Parcels provide migratory habitat for waterfowl and shorebirds
- Popular fishing and waterfowl hunting areas
- Provides open public land for hunting, fishing, trapping, and outdoor related recreation, including scenic views of Lake Champlain

Maps

Maps were created from a variety of data sources including aerial ortho-photography and geographic information systems (GIS). GIS generated maps encompass a variety of spatial data including town boundaries, transportation, water resources, ecological, and historical information.

Relationship to Other Planning Efforts

The Lake Champlain Islands Long-Range Management Plan reflects the goals and objectives to conserve wildlife species as found in conservation plans such as the Partners in Flight Conservation of Landbirds in the United States (Pashley et al. 2000), the North American Bird Conservation Initiative,

the Lower Great Lakes-St. Lawrence Valley Bird Conservation Plan, and the North American Waterfowl Management Plan (USFWS-Region 5 1996).

The Lake Champlain Basin Program has developed a conservation plan for the Lake Champlain Basin called *Opportunities for Action: An Evolving Plan for the Future of the Lake Champlain Basin.* The plan lists several high priority actions including identifying and protecting critical wildlife habitats. The VFWD is considered a key partner in achieving those objectives.

The Lake Champlain Islands Long-Range Management Plan is consistent with regional planning goals to protect the natural resources of Lake Champlain. These include regional plans developed by the Northwest Regional Planning Commission (Franklin and Grand Isle counties), Addison County Regional Planning Commission, Chittenden County Regional Planning Commission, and Rutland County Regional Planning Commission.

The VFWD is also coordinating cormorant and gull control activities on the Lake Champlain Islands with several governmental agencies and non-governmental entities including the U.S. Fish and Wildlife Service Migratory Bird Office, U.S. Department of Agriculture/APHIS/Wildlife Services, Missisquoi National Wildlife Refuge, Audubon Vermont, and The Nature Conservancy-Adirondack Chapter in New York. Double-crested cormorants have become a serious concern in many states and Canadian provinces throughout their range in North America. Subsequent to the ban of the pesticide DDT in 1973, cormorants have made a dramatic comeback. This population explosion has resulted in many conflicts with recreation, aquaculture industry, and public land managers concerned about impacts to native habitats and wildlife species from cormorants. Cormorants were first noted in the 1940s on Lake Champlain and began nesting in the early 1980s on South Sister Island and Four Brothers Islands (owned by The Nature Conservancy) in New York. Cormorant populations dramatically increased on both colonies during the late 1980s and early 1990s. The VFWD, U.S. Department of Agriculture/Wildlife Services, and U.S. Fish and Wildlife Service have received many complaints from the public urging the agencies to resolve these conflicts.

Since 1993, the VFWD has been implementing cormorant control on Lake Champlain using egg-oiling on the colony at South Sister Island to limit cormorant productivity. We have also used hazing methods and nest destruction to discourage nesting on other islands. This work proceeded under depredation permits issued by the U.S. Fish and Wildlife Service (USFWS) which oversees protection of migratory birds (such as cormorants) under the Migratory Bird Treaty Act. In 2003, the USFWS released an Environmental Impact Statement on Cormorant Management in the United States and a Public Resource Depredation Order (PRDO) to 23 northern states, including Vermont, to lethally control cormorants in lieu of a depredation permit (USFWS 2003). This PRDO now allows states experiencing negative impacts to public resources by cormorants more flexibility in controlling these birds. In 2004, VFWD began using the PRDO by lethally controlling breeding adult cormorants on South Sister Island. The objective is to reduce the population causing impacts to habitat and other wildlife on the island. These control methods are expected to continue during the span of this LRMP until the cormorant population is reduced enough to re-establish the native habitats on the islands, particularly South Sister Island.

III. PUBLIC INPUT

Summary of Public Input on Management Plan

A draft management plan for five Department of Fish and Wildlife owned islands in Lake Champlain was prepared in June 2001. The draft plan was sent to 108 organizations as well as individuals thought to have an interest in islands management. Written comments were solicited and received from groups and individuals . The five islands originally covered in the draft plan included Delta, Mud, Rock, Sloop and South Sister Islands. Written comments were received from four individuals, four organizations, and two federal government agencies. A public meeting was held on September 10, 2001, at the Grand Isle Elementary School in Grand Isle, Vermont to solicit comments from interested members of the public. A summary of all comments received with responses from VFWD is given in Appendix A.

After reviewing public comments, it was decided to develop a long-range management plan (this document) covering South Sister, Mud, Rock and Sloop Islands because very little active vegetative management was planned at these locations and no controversy was expressed. Additionally, it was decided that Delta Island should be managed as part of the Sandbar Wildlife Management Area. Therefore, this island will be included in a revised Sandbar WMA plan anticipated in the future.

IV. MANAGEMENT STRATEGIES AND ACTIONS

Four categories of management have been identified for the lands administered by the Vermont Agency of Natural Resources (ANR). These categories describe where different levels of use or types of management will be emphasized on the land. In this section of the plan, the recommended levels of use or types of management will be described for all of the land area in this WMA. This section also generally describes how the land will be managed so that the activities occurring on the land are compatible with the category assigned. The four categories are: (1) Highly Sensitive Management; (2) Special Management; (3) General Management; and (4) Intensive Management.

As part of the planning process, the lands, resources, and facilities held by the ANR are evaluated and assigned to the appropriate land management category. Assignment of management categories for the Lake Champlain Islands is based on a thorough understanding of the resources identified and the application of the over-arching lands management standards presented in the introduction section of the plan. The resources include natural communities, plants, and wildlife as well as recreation, historic, timber, and water resources. The 11 lands management standards or principles include sensitivity to scenic resources, creating and enhancing recreational resources, protecting and enhancing wildlife habitat, and involving the public.

Definitions of Land Management Categories (Classification)

1) **Highly Sensitive Management** – Actions implemented in an area with uncommon or outstanding biological (including wildlife habitat), ecological, geological, scenic, cultural, or historic significance where protection of these resources is the primary

consideration for management. Human activities and uses should not compromise the exceptional feature(s) identified.

2) **Special Management** - Actions implemented in an area with unique or special resources where protection and/or enhancement of those resources is an important consideration for management. These areas do not require the same level of protection given to highly sensitive areas and may be intensively managed for specific purposes. However, vegetative management for timber and wildlife habitat, roads, and recreational activities should not compromise the unique or special resource(s) identified.

3) **General Management** – Actions implemented in an area where the dominant uses are vegetative management for timber and wildlife habitat, concentrated trail networks, dispersed recreation, or other general land uses. In these areas, a primary management consideration is minimizing conflict between the activities, as well as minimize impacts to lands categorized as more sensitive when they are adjacent to a general management area. In addition, more sensitive resources that occur within these areas may receive special consideration.

4) **Intensive Management** – Actions implemented in an area that is easily accessible and characterized by a high level of human activity and high intensity development on or adjacent to state land. Aesthetics and safety are the primary management considerations in these areas. However, more sensitive resources that occur within these areas may receive special consideration.

Highly Sensitive Management

There are no lands with this classification within this plan.

Special Management

Mud, Rock, and Sloop Islands fall within this ANR land classification because of their scenic and habitat values. Management will be focused on:

1. Maintain native plant and animal communities.

2. Control of invasive plants. Invasive plants will be rigorously controlled. Methods will include the use of mechanical, chemical, and biological control methods in accord with ANR policies.

3. Prevent establishment of cormorant and ring-billed gull nesting colonies. VFWD will monitor islands annually for cormorant and gull nesting and use both lethal and non-lethal control measures to deter nesting attempts by these species.

4. Promote low-impact wildlife-based recreation. All activities will be passive and non-motorized and will include fishing, hunting, trapping, wildlife viewing, and hiking. No overnight camping will be allowed.

General Management

South Sister Island is contained within this classification. Management of the island will be focused on:

1. Reduction (or elimination if necessary) of cormorant and ring-billed gull nesting to restore the island's native vegetation and habitats. Management could be intensive at times and include lethal and non-lethal control measures to eliminate or reduce impacts by nesting birds.

2. Restore native plant communities and wildlife habitats. Due to the damage caused by the cormorant and gull colony over the years, this island has lost nearly all of its native vegetation and wildlife. Restoration activities could include disking, liming, fertilizing, herbicide applications, and plantings of native trees, shrubs, forbs, and grasses.

3. Conduct research. Several research projects have taken place on the island since the 1960s. These have included studies on waterfowl, colonial waterbirds, and plant ecology. A current research proposal is being planned to address the impacts of cormorant management on the Great Lakes and Lake Champlain. The study will investigate the impacts of control activities on other colonial waterbirds and how it affects cormorant distribution within Lake Champlain and the region. These types of research activities are likely to continue in the future.

4. Promote low impact wildlife-based recreation. Recreation, except for an occasional waterfowl hunter in the fall, is very low due to the stench and abundance of guano, and noise from the gull and cormorant colony. Birdwatchers occasionally visit the island to view the nesting colony. Duck hunting blinds are erected along the shoreline during the fall waterfowl season. All recreation activities will be passive and non-motorized and will include fishing, hunting, trapping, wildlife viewing, and hiking. No overnight camping will be allowed.

Intensive Management

There are no lands within this classification for this plan.

V. IMPLEMENTATION SCHEDULE

Year	Activity
2005-2010	1. Continue cormorant and gull control on South Sister Island. Initiate habitat plantings and vegetation monitoring where appropriate.
	2. Control invasive species on Rock Island and plant native plant species for ground cover and willows for shoreline stabilization.
	3. Evaluate the results of Activities # 1 and 2.
	4. Destroy abandoned camp on South Sister Island for safety reasons.
	5. Assist in cormorant and gull research on all F&W islands.
2011-2015	6. Assess invasive species and initiate control if needed.
	7. Assess habitat plantings of Activities # 1 and 2.
2016	8. Re-evaluate Management Plan.

VI. MONITORING AND EVALUATION

The Lake Champlain Islands Long-Range Management Plan will rely on monitoring and evaluation by agency staff to decide whether the goals for the parcel are being met. Monitoring and evaluation are essential to any lands management program as they provide the information necessary to track progress in achieving management goals and objectives and the effectiveness of various approaches to resource management issues. Monitoring is needed on invasive plant species, natural community types, recreational activities, and response by wildlife to management activities such as cormorant and gull control. The strategies to be utilized include periodic site visits by Agency personnel and easement holders. Other techniques that will be used include tree health surveys, annual waterfowl surveys, and periodic ground checks. Agency personnel involved in these efforts will include VFWD wildlife biologists, ecologists, technicians, and fish and wildlife wardens. In addition, the Vermont Housing and Conservation Board and Lake Champlain Land Trust may also periodically inspect the property to insure compliance with easement restrictions and protection of natural, historic, and cultural resources.

VII. APPENDIXES

APPENDIX A

PUBLIC INPUT

• An Advisory Committee was formed in 2000 to provide VFWD with guidance for the Lake Champlain Islands Long-Range Management Plan. Members included Paul Boileau (fishing charter boat captain), Mark LaBarr (Audubon Vermont), David Tilton (US Fish and Wildlife Service), Dale Toutant (waterfowl hunter), and Rose Paul (The Nature Conservancy). The Committee met on November 9, 2000. A summary of the comments (with VFWD response in italics) follows:

1. Maintain Rock, Sloop, and Mud Islands free of cormorant and gull nesting. Keep the islands in their current natural vegetative condition.

VFWD currently employs annual monitoring and non-lethal control measures to keep cormorants and gulls from nesting on these islands. There have been no successful nesting attempts on Mud, Rock, and Sloop Islands for several years. Plantings are occasionally scheduled for these islands but VFWD uses native plant species appropriate for the islands.

2. Management goals for South Sister Island (Young Island) should be to develop/maintain a mixed species bird nesting colony comparable to what existed in the 1980s.

All of the rare colonial waterbird species on South Sister Island have been eradicated due to the impact cormorants, and to a lesser extent gulls, have had on the island's vegetation. The habitat must be restored first in order to insure that all suitable bird species can nest on the island. This cannot be accomplished with the current level of cormorants and gulls and therefore population control measures and habitat modifications must be implemented. The vegetation should respond and grow back once the cormorant and gull populations are reduced (or eliminated if needed) on the island. This will be supplemented by the VFWD through various grass, shrub, and tree plantings. The resulting habitat will dictate which bird species will likely be found on the island. The VFWD does not propose to manage the island strictly as a colonial waterbird nesting area, although it is possible that some of the former species could eventually return to the island.

3. Waterfowl hunting occurs and should continue at some level.

Waterfowl hunting continues to be pursued on the islands although it may have been reduced due to habitat destruction by gulls and cormorants, and the abundance of guano and the odor at South Sister Island. The VFWD is committed to maintaining the islands as areas to pursue waterfowl hunting and other wildlife-based recreational activities.

4. Present bird populations have denuded the island and cause a significant odor problem which deteriorates the recreational experience of boaters and nearby property owners. Fishing is thought to have deteriorated in the vicinity which may have a negative effect on area tourism and economy.

There is a clear cause-effect relationship between high cormorant and gull numbers and the impact they have had on the island's vegetation. During summer months, the odor of guano is oppressive. This has likely affected many peoples' desire to visit the island. The link between fishing impacts and cormorants is less clear but there may be at least some local impacts around the island. This part of cormorant ecology on Lake Champlain has not been adequately studied.

5. There is a concern that high bird numbers producing excrement may have a negative effect on the public water supply intake which is close to South Sister Island.

Several sources of public water supply are within 1.0-1.5 miles of South Sister Island. To date there have been no instances of polluted water from South Sister Island entering these intake points.

6. All gull and cormorant nesting should be restricted to South Sister Island. Control activities need to be continued but should not contribute to birds attempting to set up new nest sites off South Sister Island or the Department should commit staff and resources to rapidly respond to new nesting attempts to avoid passing the problems along to other people.

The current population levels of nesting ring-billed gulls and double-crested cormorants on South Sister Island is not compatible with VFWD goals of managing state lands for the benefit of all wildlife species and maintaining wildlife populations in balance with their habitat and ecological and social carrying capacities. Therefore, South Sister Island will not be considered a "sacrificial lamb" in order to meet the conservation goals of other landowners on Lake Champlain. It is also unreasonable to assume that other islands in Lake Champlain would be safe from cormorants and ring-billed gull colonies becoming established if VFWD could only refrain from implementing any population control at South Sister Island. Cormorants regularly attempt to colonize new islands on Lake Champlain. It is only because of VFWD, USDA/WS, and other landowners control efforts that they have not been successful in these attempts. It is clear that the Lake has not reached its ecological carrying capacity for cormorants, although its social carrying capacity has probably been surpassed. It is the responsibility of all landowners to limit the spread of these species if they are not wanted. While the Department certainly does not desire to "pass the problem on to someone else" it also has a responsibility to manage its lands for the public good. The cormorant and gull situation is a lake-wide and regional problem and requires the cooperation of all landowners and land management entities. The VFWD will take all reasonable steps to minimize the spread of cormorants and gulls to other lands but it makes no guarantee that no new colonization will occur, particularly if a landowner does not support cormorant control on their property.

7. Some level of island re-vegetation is needed to support other bird species. Soil enhancements, planting, and other activities will probably be needed to make management reasonably timely.

A habitat restoration plan is a component of the Lake Champlain Islands LRMP. Grass, shrub, and tree plantings will be schedule along with any needed soil enhancement and control of noxious weed infestations. The VFWD will consider all methods of weed control including mechanical, biological, and chemical treatments. Monitoring of vegetation and plantings will also be implemented.

8. In the short term (while the USFWS Cormorant Management EIS is being developed), VFWD should continue egg-oiling and work toward more responsive permit conditions.

Egg-oiling will be continued as one of the cormorant and gull treatments in the LRMP. The requirement for a permit for cormorant control has been eliminated with the issuance of the Public Resource Depredation Order in 2003. A depredation permit will still be needed for gull control, however.

• A draft management plan was completed during the summer of 2001 based on the above comments from the Advisory Committee. A group of over 100 individuals, government agencies, and non-governmental organizations was sent a copy of the draft and asked to provide comment. A public meeting was also held on September 10, 2001 in Grand Isle, Vermont to solicit comments on the draft Long-range management plan. All comments received pertained only to South Sister Island. These comments and VFWD's responses (in italics) are summarized as follows:

1. Will USFWS Cormorant Plan and EIS make any difference in obtaining depredation permits or effectively controlling cormorants?

The issuance of the Public Resource Depredation Order by the U.S. Fish and Wildlife Service in 2003 eliminated the need for a depredation permit to implement lethal control when cormorants were known to be causing damage to natural resources at the local level. However, the PRDO does not allow state, federal, or tribal governments to control cormorants without discretion under the Migratory Bird Treaty Act.

2. Why can southeastern states shoot cormorants and we can't?

Cormorants could always be lethally controlled with a depredation permit from USFWS. The PRDO now allows lethal control without a depredation permit. The southeastern states were able to lethally control cormorants by means of the Aquaculture Depredation Order, which allowed fish farmers to destroy cormorants actively predating on fish farms. That depredation order only applied to certain southeastern states.

3. Cormorants play a role in spreading zebra mussels to interior waters.

Zebra mussels are generally spread through water movement but it is conceivable that mussel larvae could hitch a ride on a cormorant (or any other water bird or mammal including ducks, herons, beaver, etc.). However, zebra mussels require certain types of water chemistry and many interior waters are not conducive to large infestations of this species.

4. Concern about water pollution from bird feces. Have any tests been made?

Tests have been performed near public water intake areas, and to date, there has not been a problem due to cormorants because of the large distances between intake areas and South Sister Island.

There are certainly pollution problems around the island, however. Water clarity has been hampered and abundant algal growth is common around South Sister Island.

5. Sharp declines in numbers of small yellow perch and rock bass are related to cormorant populations/feeding.

There is no evidence to support this contention on Lake Champlain because the issue has not been adequately investigated. However, studies on other regional water bodies such as Oneida Lake in New York, have confirmed impacts on certain fish species due to cormorants.

6. Salmon are injured in spring from cormorant predation attempts.

Most of these impacts are related to fish stocking events in which cormorants feed on these fish at or near the stocking release site. This issue has been answered by stocking earlier before cormorants arrive on Lake Champlain or by using hazing methods to frighten cormorants away from stocking areas.

7. Cormorant populations are underestimated by nest counts because there are a lot of migrating birds, too. The lake population is up in spite of nest number declines.

Data from nest counts is only used to determine the number of breeding adults on Lake Champlain. Other population surveys throughout the Lake are also conducted to determine the number of non-breeding cormorants and are combined with the breeding census to arrive at an overall cormorant population for Lake Champlain. Recent population surveys support the notion that cormorant numbers have been increasing since the early 1990s, mainly from non-breeding birds. There is also some evidence, however, that the population on Lake Champlain may be beginning to stabilize.

8. Cormorants are ecological monitors. Have eaten a lot of fish with no sickness/deformities.

Lake Champlain cormorants may be picking up a variety of toxins including mercury, lead, and PCBs. All of these toxins are known to be in Lake Champlain and its fish and wildlife. Because they are migratory, cormorants may also be exposed to a variety of pollutants in other parts of their range.

9. Gulls do some good as scavengers, but they are also fish eaters. Populations need control.

There is no reason to believe that gulls may be impacting fish populations. Gulls are opportunistic in their feeding strategy and are not limited to aquatic organisms. Landfills, agricultural, and urban areas provide a more reliable source of food. Gulls are often considered a nuisance in these areas because of their guano or possibility of spreading diseases to domestic fowl. The control of gulls at South Sister Island would help to limit their productivity and ease the strain on the island's habitat. Control measures to achieve this objective will be adopted into the LRMP.

10. South Sister Island has been observed since 1946. Used to be treed (locust, white cedar, some openings with grass, raspberry) and many years ago was used as sheep pasture. Would like to see more trees on South Sister Island.

The LRMP has a specific objective to restore the island's habitats, including trees such as white cedar, eastern cottonwood, green ash, and American elm. Grasses and shrubs such as raspberry would also be appropriate.

11. Would like to see the island restored to what it was like when it was acquired in 1959.

The goal of the plan is to allow the vegetation on all the islands to remain natural and undisturbed. This includes South Sister Island once it has begun to establish itself after the plantings, invasive plant control, and soil enhancements have been completed. There is no known historical data on the vegetation at South Sister Island from a pre-European contact standpoint. It has a long history of sheep pasturing which likely altered its vegetation considerably. Its soils and bedrock suggest that it may have been once dominated by northern white cedar like many of the islands in Lake Champlain. The dominant deciduous overstory noted in 1959 may have been a successional stage observed once sheep pasturing was terminated. Regardless, either or both types of plant communities would be acceptable results for achieving the goal of habitat restoration.

12. The population goal of 300 cormorant nesting pairs is too high. It should be zero.

It is very likely that 300 nesting pairs (600 cormorants) on South Sister Island would be a significant impairment to achieving any habitat restoration goal. Young sapling to pole-sized trees would soon be stripped of their leaves and branches by nesting cormorants resulting in the death of many of the trees. Therefore, a gradual but large reduction of adult breeding cormorants is necessary in order to restore the habitat. It may be necessary to even eliminate all nesting cormorants initially to allow the habitat to restore itself. Therefore, VFWD will not set any specific population goal for breeding cormorants on South Sister Island if the primary objective is to restore the island's habitat. Lake-wide and regional population goals could be set for breeding cormorants in cooperation with other landowners, taking into account each individual landowners' objectives for their property.

13. Concern about VFWD cormorant control activities on South Sister Island pushing birds to nest at other sites. Audubon Vermont is concerned about cormorants impacting common terns and passing the cormorant problem on to them.

In the FEIS for Cormorant Management in the United States, the USFWS determined that the impact of cormorants on ground nesting common terns in the Great Lakes was minimal. In the Final EA of a USFWS Action to Issue a Migratory Bird Depredation Permit for the Take of Cormorants and Gulls on Lake Champlain Islands, Vermont, the USFWS determined that the potential for cormorants to impact common terns was also minimal. Differences between terns and cormorants in their choice of microhabitats for nesting decrease the chances of competition for nest sites. Effects of control activities are typically not seen until the following year when cormorants arrive to begin nesting. During that time the decision to nest on a different island is made by the breeding pair. Cormorants arrive on Lake Champlain in early April, 4-6 weeks prior to the arrival of common terns on Lake Champlain. This provides enough opportunity for Audubon managers to initiate cormorant control to deter any new nesting attempts. Audubon's managers have been using this strategy already for many years.

14. Would like to see island closed during bird nesting season and prohibition on developed recreational facilities. Oppose control of cormorants and gulls.

Closure of South Sister Island to promote the protection of two species that have caused numerous impacts to public resources would be contrary to the VFWD goal of maintaining wildlife in balance with their habitat, and providing wildlife-based recreational opportunities. No developed recreational facilities are planned for any of the 4 islands covered in the LRMP.

15. Supportive of cormorant and gull population management.

APPENDIX B

RESOURCE ANALYSIS

1. Ecological Assessment

Biophysical Region and Climate

Vermont can be divided into eight regions that share features of climate, topography, geology, human history, and natural communities (Girton and Capen 1997). The Lake Champlain Islands are located in the Champlain Valley biophysical region, the low-lying lands surrounding the lake in Addison, Chittenden, Franklin, and Lamoille Counties (see Figure 2). Adjacent lands in New York and Quebec are also in this biophysical region. The weather, precipitation patterns, hydrology, bedrock, and soils of the region are all influenced by Lake Champlain (and much larger bodies of salt water that preceded it). The Champlain Valley is warmer and drier than most other regions in Vermont. Elevations range from lake level (95') to about 1800'. The growing season is comparatively long, and winters are relatively mild. As a result, many of the animals, plants, and natural communities found here are more characteristic of places to our south. The geology of the Champlain Valley reflects a long history of glacial, marine, and lake activity. Bedrock is mainly limestones, dolomites, and shales that were deposited on the floor of ancient inland seas. The high calcium content of many of these rocks makes them a productive substrate for plant growth. The soils found on top of these rocks are mostly loams, clays, and silts deposited in more recent times by the sea that formed as the last glaciers retreated. These soils can be very deep, and are some of the most productive farmlands in the state. Many of the plant assemblages found here grow especially well in these fine, rich sediments.

Bedrock and Soils

The Lake Champlain Islands are characteristic of the Champlain Valley in many ways. They are at the lowest elevation and several are sometimes inundated during high water. The bedrock and soils found on the 4 islands in this LRMP include:

Rock Island
Farmington extremely rocky silt loam, 5-20% slopes. Bedrock is commonly limestone or less commonly quartzite with limestone outcrops. Shallow to bedrock, surface is often broken with many stones. Soils are very droughty. Severely limiting to farming and non-farm uses.

Mud Island

Vergennes clay, 2-6% slopes. These soils are well-drained clays formed on water-laid deposits containing lime. They are sticky and plastic when wet and difficult to dig or till. When found along Lake Champlain, this type is severely eroded by wave action. Supplemental drainage is often needed to dry out the soils for agricultural use. This is a widely distributed soil type in the Champlain Valley and is found in many of the farmed areas of Addison County.

Sloop Island

No soil surveys have been done for this island.

South Sister Island

a. Benson very rocky loam, over massive limestone, 3-8% slopes. The Benson soil series consist of soils over limestone bedrock and are somewhat droughty to very droughty. Soils are shallow and tend to dry out early in the spring. The soils are suitable for native pasture or trees. Native pasture tends to be of poor quality. This soil type comprises the majority of the island's acreage.

b. Covington silty clay loam, 3-8% slopes. These are dark-colored clay soils that may stay wet for extended periods in the spring. They are commonly found in pockets between ridges throughout Grand Isle County. It is considered a productive soil for agriculture but may require some supplemental drainage and applications of nitrogen nitrate as fertilizer. This soil type is found in the northeast corner of the island.

Hydrology

Seasonal fluctuations of Lake Champlain's water level play a key role in maintaining many of the habitats found on the Islands. During spring high water levels, for example, sand and cobble beaches and floodplain forests are inundated with water, which deposits nutrients, seeds, and other materials that remain as the lake recedes. Water and ice action are significant natural disturbance processes in many of the habitats found on the Islands. For example, the ground surface of Sloop Island is inundated during the spring months in most years.

Natural Community Types

A natural community is composed of an interacting assemblage of organisms, and the physical context (geology, hydrology, climate, natural disturbance regime, etc.) in which they occur (Whittaker 1962, Sneddon et al. 1998). The 80 natural community types described in Vermont repeat across the landscape in patches of various sizes (Thompson and Sorenson 2000). When two or more unconnected patches occur near each other, they often function as a unit: elevation, hydrology, and geology are similar, organisms move back and forth between the patches, and natural disturbances affect them similarly. Natural community patches of this sort are considered to be a single occurrence of the natural community type. Thus, an occurrence of a natural community type may be composed of one to many patches or polygons. The natural communities of Mud, Rock, Sloop, and South Sister Island have not been assessed, but because they are very small and widely scattered parcels, they could not be considered to be examples of statewide significance. The communities likely to be found on the islands include:

Upland Forests
Mesic Maple-Ash-Hickory-Oak Forest
Limestone Bluff Cedar-Pine Forest

Floodplain Forests
Lakeside Floodplain Forest

Upland Shores
Lake Shale or Cobble Beach

Rare, Threatened, and Endangered Species

There are no threatened or endangered species known to exist on any of the four islands covered under this management plan. South Sister Island was the last known breeding location of black-crowned night-heron and cattle egret in Vermont but were eliminated in the late 1990s due to habitat degradation caused by cormorants. The only existing colony of these species occurs on Four Brothers Islands on the New York side of Lake Champlain. These islands also are in the process of being impacted by cormorant and gull nesting and black-crowned night-herons have decreased to very low numbers. It is expected that they will soon be extirpated from those islands (and therefore, Lake Champlain) in the next few years.

Non-Native Species

The four islands have a mix of both native and non-native species. Isolated islands are generally believed to be very sensitive to human and natural disturbances. Plant and animal communities may be sensitive to herbivory by livestock, invasive weed species, and excessive recreational use due to their small size and exposure on Lake Champlain. All of the islands have some level of non-native plants, the worse case being found on South Sister Island. Nearly all of the plants growing on this island are comprised of four non-native species: garlic mustard, lambs-quarters, thistles, and stinging nettles. This alteration of native plant communities has been caused almost entirely by the high density of cormorant and ring-billed gull nests on the island (Daniel 1989).

Rock Island's vegetation is comprised predominantly of native species but has a dense understory of invasive honeysuckle which was probably spread by birds from the mainland. Mud and Sloop Islands are comprised mostly of native species with a few occurrences of invasive plants. Invasive plant species will always be a management concern on the islands.

Wildlife and Habitats

Due to their size, the four islands are limited in their habitat and wildlife diversity. Rock, Mud, and Sloop islands only support a few trees and scattered patches of shrubs and grasses. All four islands are best known as habitat for birds, including waterfowl. They provide nesting areas and stop-over areas for many bird species, including shorebirds for which Vermont is not well-known. Traditionally, the islands were acquired for their value as waterfowl nesting areas. Species that nested here included American black duck, mallard, wood duck, ring-necked duck, and Canada goose. However, the islands are also important for other bird species. Rare species have included black-crowned night heron, cattle egret, great egret, and snowy egret. South Sister Island, due to its

larger size, probably has the most potential to support a diverse bird community. However, its diversity has been impacted due to the destruction of its vegetation by cormorants and gulls. Although the islands are very small, they are important habitats because they provide isolation and sanctuary from other areas of Lake Champlain that have more recreation or development pressure.

The only other wildlife species known to occur on the islands include red fox, raccoon, coyote, white-tailed deer, and small mammals such as voles, mice, and perhaps Norway rats. The islands are so small and isolated from the mainland, that some of these mammals may only be infrequent or rare visitors. The absence or infrequent use of the islands by mammalian predators is also what makes them so attractive to some nesting bird species.

2. Historic and Cultural Resources

The Lake Champlain Islands WMA, except for South Sister Island, do not have a well documented history of use by people of the Champlain Valley. Surely, the Abenaki and Mohawk people used the islands for hunting, fishing, plant gathering, and ceremonial use. When Europeans settled in the Champlain Valley, the islands were probably used for hunting and fishing. During the Revolutionary War and War of 1812 some of the islands were used during naval battles as cover from enemy ships. During the 19th century the larger islands such as South Sister were likely logged/cleared for sheep pasturing. There are no known significant historic or cultural resources for these four islands.

3. Recreation

Most of the 71 islands in Lake Champlain are privately owned. The State of Vermont owns 12 of these islands (7 owned by VT Dept. Forests, Parks, and Recreation, 5 by VFWD). Many of these islands provide the only opportunity for the general public to enjoy this type of recreational experience. The four islands covered in this LRMP are open to the public for non-commercial and non-motorized use. Access is discouraged from April to June to protect bird nesting. Popular activities include waterfowl hunting, fishing, hiking, and wildlife observation. Canoeing and kayaking around the islands is also very popular. Current access to the Islands is by boat, canoe, or kayak. Overnight camping and camp fires are not allowed on the islands.

4. Water Resources

Other than Lake Champlain, there are no other water bodies associated with these four islands. Water quality around South Sister Island has been impacted by large amounts of guano and bird carcasses from the cormorant/gull colony. This is primarily a local water quality issue around the island and is not considered a threat to Lake Champlain or any drinking water source. The planned reduction of cormorant and ring-billed gull populations on South Sister Island will result in an improvement to the water quality around the island.

5. Timber Resources

There are no opportunities for timber harvesting on any of the four islands due to their small size. No timber management is planned for these properties.

APPENDIX C

Summary of Some Policies and Guidelines Used in the Management of Vermont Agency of Natural Resources Lands

Some of the highlights of the many policies and guidelines used in managing Vermont Agency of Natural Resources lands are listed below. In general, these were in effect at the start of this Long-range management plan. If more information is needed, refer to current policies and guidelines which can be made available upon request. The information is grouped into some general categories to make this document easier to use.

Acquisition of Land

Lands Conservation Plan: A Land Acquisition Strategy for the Agency of Natural Resources, October, 1999 - Standards and procedures for the Agency of Natural Resources to acquire lands.

Cultural and Archaeological Resources

State of Vermont laws applicable to archeological resources - Standards and operating procedures for state owned lands.

Fish and Wildlife

Vermont hunting, fishing, and trapping regulations.

Wildlife Management Areas Operational Procedures Manual, Vermont Department of Fish and Wildlife - Standards for management of wildlife management areas.

Management Guide for Deer Wintering Areas in Vermont, Fish and Wildlife, 1990 - Standards for managing for deer.

Landowner's Guide to Wildlife Habitat Management, Fish and Wildlife, Fish and Wildlife, 1995 - Standards for managing for a variety of wildlife species on state and private land.

Native Vegetation for Lakeshores, Streamsides and Wetland Buffers, Environmental Conservation, 1994, Standards for buffer strips along lakes, streams and wetlands in Vermont.

Rare and Endangered Species - Listing of species protected under state regulations.

Gravel Pits

Forests, Parks and Recreation Policy #3, 1991 - Standards for use of gravel pits on Forests, Parks and Recreation lands

Land Use and Development Act 250 - Law governing plans for land use and development in Vermont.

Mountain Top Communications Facilities

Siting, Use and Management of Electronic Communication Facilities on Properties Owned by the State of Vermont, Agency of Administration, 1998.

Natural Area Designation

Natural Areas Law and Forests, Parks and Recreation Policy #7 - Standards and guidelines for designation of Natural Areas on state forest and parks lands.

Pesticides Use

Forests, Parks and Recreation Policy #9 - Regulations on the use of pesticides on state forest and parks lands.

Prescribed Fire

Prescribed Burn Directive, Vermont Department of Forests, Parks and Recreation, 1989 - Procedures for planning and execution of prescribed burns.

Recreation

Uses of State Lands, Agency of Natural Resources Policy, 1999 - Criteria for appropriate uses and when permits and licenses are and are not required.

Forests, Parks and Recreation Policies and Procedures Manual, 1990-1999 - Procedures and standards for administering recreational activities on state forests and parks lands.

State Park Ranger's Manual, Forests, Parks and Recreation, 1999 - Operating procedures, rules, regulations, and standards for recreational activity on state forests and parks land.

Scientific Research

Forests, Parks and Recreation policy # 8 - Standards and guidelines for research on state lands.

Silviculture

Silvicultural References Manual, Forests, Parks and Recreation, 1997 - Guidelines for the Intent to Heavy Cut notification process.

Acceptable Management Practices (AMP) Guidelines, 1987 - Practices for maintaining water quality on logging jobs.

Wetlands Regulations, 1990 - Regulations which outline practices for logging around wetlands in Vermont.

Native Vegetation for Lakeshores, Streamsides and Wetland Buffers, Environmental Conservation, 1994 - Standards for buffer strips along lakes, streams and wetlands in Vermont.

Vermont Streambank Conservation Manual, Agency of Natural Resources, 1982 - Guidelines for construction around streams.

Water Resources

Acceptable Management Practices (AMP) Guidelines, 1987 - Practices for maintaining water quality on logging jobs in Vermont.

Long Trail Construction and Maintenance Standards, Green Mountain Club, 1995 - Trail construction standards for public and private land.

Native Vegetation for Lakeshores, Streamsides and Wetland Buffers, Environmental Conservation, 1994 - Standards for buffer strips along lakes, streams and wetlands

Vermont Streambank Conservation Manual, Agency of Natural Resources, 1982 - Guidelines for construction around streams.

APPENDIX D

Authorization to Plan and Manage

Statutory Authority

The Vermont General Assembly has authorized the Agency of Natural Resources and its Departments to acquire lands, hold interests in lands, and conduct land management activities. Authority is vested in several statutes that collectively empower the Agency, upon approval of the Governor or General Assembly, to acquire lands, accept donations of lands or interests in lands, exchange or sell lands or interests in lands for public benefit, and to manage those lands for a variety of public purposes.

Specific authorizing statutes are:

- **Title 3, Chapter 51, Section 2825**: The primary duties of the secretary are to coordinate the activities of the various departments and divisions of the agency for the proper development, management and preservation of Vermont's natural resources, to develop policies for the proper and beneficial development, management, and preservation of resources in harmony with the state comprehensive planning program and to promote the effective application of these policies by the departments and divisions affected.

- **Title 10, Chapter 83, Section 2601**: Establishes the general purposes and policies to acquire and manage state lands and authorizes the Department of Forests, Parks & Recreation to undertake such activities.

- **Title 10, Chapter 83, Section 2603**: Establishes the general powers and duties of the commissioner of the Department of Forests, Parks & Recreation to manage state lands.

- **Title 10, Chapter 103, Section 4144**: Authorizes the Department of Fish & Wildlife to acquire state lands.

- **Title 10, Chapter 103, Section 4147**: Authorizes the Department of Fish & Wildlife to exchange, sell, or lease lands.

- **Title 10, Chapter 37, Section 905b**: Authorizes the Department of Environmental Conservation to acquire and manage lands and the rights to protect the state's water resources.

- **Title 10, Chapter 155, Section 6301-5**: Authorizes acquisition of rights less than fee of real property.

APPENDIX E

GLOSSARY

The following is a series of key words and their definitions used in the development of Long-Range Management Plans for Vermont Agency of Natural Resource lands.

Acceptable management practices (AMPs). In this plan, a series of erosion control measures for timber harvesting operations, as identified in state statutes. The AMPs are the acceptable method for the control and dispersal of water collecting on logging roads, skid trails, and log landings to minimize erosion and reduce sediment transport and temperature changes in streams.

All-aged (Uneven-aged) system. Timber management which produces a stand or forest composed of a variety of seral stages. Regeneration cutting methods in this system include single tree selection and group selection.

Basal area. A measure of the standing crop of trees on an area. It is determined by estimating the total cross-sectional area of all trees measured at breast height (4.5 feet) expressed in square feet per acre.

Best management practices. Practices determined to be the most effective and practicable means of preventing negative impacts of silvicultural activities.

Biophysical region. A region with shared characteristics of climate, geology, soils, and natural vegetation. There are currently eight biophysical regions recognized in Vermont.

Block. A land management planning unit.

Browse. The part of leaf and twig growth of shrubs, vines, and trees available for animal consumption.

Buffer (Riparian Buffer Zone). Vegetated land adjacent to streams or lakes between the water and edge of other land uses. Riparian buffer zones are typically undisturbed areas, consisting of trees, shrubs, groundcover plants, duff layer, and a naturally vegetated uneven ground surface, that protect the water body and the adjacent riparian corridor ecosystem from the impact of these land uses.

Canopy. The overhead cover of branches and foliage formed by the crowns of adjacent trees and shrubs.

Capability. The potential of an area to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends on current conditions and site conditions such as climate, slope, landform, soils, and geology as well as the application of management practices such as silvicultural protection from fire, insects, and disease.

Cleaning (Weeding). Regulating the composition of a young stand by eliminating some trees and encouraging others, and also freeing seedlings or saplings from competition with ground vegetation, vines, and shrubs.

Clearcutting. A harvest method that removes all trees from a designated area during the operation, for the purpose of creating a new, even-aged stand.

Commercial forest land. Land declared suitable for producing timber crops and not withdrawn from timber production by statute or administrative regulation.

Conservation. The careful protection, planned management, and use of natural resources to prevent their depletion, destruction, or waste.

Conservation easement. Acquisition of some rights on a parcel of land designed to keep the property undeveloped in perpetuity.

Cover. Vegetation which provides concealment and protection to wild animals.

Cultural operation. The manipulation of vegetation to control stand composition or structure, such as site improvement, forest tree improvement, increased regeneration, increased growth, or measures to control insects or disease. Examples of methods used are timber stand improvement, cleaning or weeding, release, and site preparation.

DBH (diameter at breast height). The diameter of the stem of the tree measured at breast height (4.5 feet or 1.37 meters) from the ground.

Deer wintering area. Forest area with at least 70 percent conifer that provides suitable, stable habitat to meet deer needs during the winter.

Den tree. A live tree at least 15 inches DBH (diameter at breast height) containing a natural cavity used by wildlife for nesting, brood rearing, hibernating, daily or seasonal shelter, and escape from predators.

Developed (or intensive) recreation. Activities associated with man-made structures and facilities that result in concentrated use of an area. Examples are campgrounds and ski areas.

Diameter at breast height (DBH). The diameter of the stem of the tree measured at breast height (4.5 feet or 1.37 meters) from the ground.

Dispersed recreation. Outdoor recreation activities requiring few, if any, support facilities.

Ecological processes. The relationships between living organisms and their environment. Among these processes are natural disturbances such as periodic fire, flooding, or beaver activity; natural stresses such as disease or insects; catastrophic weather-related events such as severe storms or lightning strikes; or more subtle ongoing processes such as succession, hydrology, and nutrient cycling.

Ecological reserve. An area of land managed primarily for long-term conservation of biodiversity.

Ecosystem. A complex array of organisms, their natural environment, the interactions between them, the home of all living things, including humans, and the ecological processes that sustain the system.

Ecosystem management. The careful and skillful use of ecological, economic, social, and managerial principles in managing ecosystems to produce, restore, or sustain ecosystem integrity, uses, products, and services over the long-term.

Endangered species. A species listed on the current state or Federal endangered species list (VSA Title 10, chapter 123). Endangered species are those which are in danger of becoming extinct within the foreseeable future throughout all or a significant portion of their range.

Even-aged system. Timber management that produces a forest or stand composed of trees having relatively small differences in age. Regeneration cutting methods in this system include clearcutting, seed tree (seed cut) method, and shelterwood method.

Forest health. Condition in which forest ecosystems sustain their complexity, diversity, resiliency, and productivity.

Forest type. A natural group or association of different species of trees which commonly occur together over a large area. Forest types are defined and named after the one or more dominant species of trees, such as the spruce-fir and the birch-beech-maple types.

Forestry. The art and science of growing and managing forests and forest lands for the continuing use of their resources.

Fragmentation. Division of a large forested area into smaller patches separated by areas converted to a different land use.

Game species. Animals habitually hunted for food, particular products, sport, or trophies.

Geographic Information Systems. A computer-based means of mapping lands and resources and communicating values associated with them (GIS).

Green certification. A process, sponsored by several international organizations, that promotes sustainable forest management practices, providing a marketplace identify for forest products certified to have been grown and manufactured in a sustainable manner.

Group Selection. The removal of small groups of trees to meet a predetermined goal of size, distribution, and species.

Habitat. A place that provides seasonal or year round food, water, shelter, or other environmental conditions for an organism, community, or population of plants or animals.

Hardwood. A broad leaved, flowering tree, as distinguished from a conifer. Trees belonging to the botanical group of angiospermae.

Healthy ecosystem. An ecosystem in which structure and functions allow the maintenance of the desired conditions of biological diversity, biotic integrity, and ecological processes over time.

Heritage Sites. Sites identified by the Vermont Nongame and Natural Heritage Program of the Department of Fish and Wildlife, which have rare, threatened, or endangered species of plants or animals. Heritage sites are identified using a common standards-based methodology, which provides a scientific and universally applicable set of procedures for identifying, inventorying, and mapping these species.

Intensive (or developed) recreation. Outdoor recreation activities requiring major structures and facilities.

Interior dependent species. Those wildlife species that depend on large unbroken tracts of forest land for breeding and long term survival. The term is also often used in conjunction with neotropical migratory bird species requiring large patches of fairly homogeneous habitat for population viability.

Intermediate treatment. Any treatment or tending designed to enhance growth, quality vigor, and composition of the stand after its establishment or regeneration and prior to the final harvest.

Land conservation. The acquisition or protection through easements of land for wildlife habitat, developed state parks, and working forests.

Landscape. A heterogeneous area of land containing groups of natural communities and clusters of interacting ecosystems. These can be of widely varying scales but normally include a range of elevations, bedrock, and soils.

Mast. The fruit (including nuts) of such plants as oaks, beech, hickories, dogwood, blueberry, and grape, used for food by certain wildlife species.

Motorized use. Land uses requiring or largely dependent on motor vehicles and roads.

Multiple-use forestry. Any practice of forestry fulfilling two or more objectives of management, more particularly in forest utilization (e.g. production of both wood products and deer browse).

Multiple-use management. An onsite management strategy that encourages a complementary mix of several uses on a parcel of land or water within a larger geographic area.

Native (species). A plant or animal indigenous to a particular locality.

Natural Area. Limited areas of land, designated by Vermont statute, which have retained their wilderness character, although not necessarily completely natural and undisturbed, or have rare or vanishing species of plant or animal life or similar features of interest which are worthy of preservation for the use of present and future residents of the state. They may include unique ecological, geological, scenic, and contemplative recreational areas on state lands.

Natural community. An assemblage of plants and animals that is found recurring across the landscape under similar environmental

conditions, where natural processes, rather than human disturbances, prevail.

Nongame species. Animal species that are not hunted, fished, or trapped in this state. This classification is determined by the state legislature.

Northern hardwood. Primarily sugar maple, yellow birch, and beech. May include red maple, white ash, white birch, black cherry, red spruce, and hemlock.

Old growth forest. A forest stand in which natural processes and succession have occurred over a long period of time relatively undisturbed by human intervention.

Outdoor recreation. Leisure time activities that occur outdoors or utilize an outdoor area or facility.

Overstory. That portion of the trees, in a forest of more than one story, forming the upper or upper-most canopy layer.

Pole. A tree of a size between a sapling and a mature tree.

Pole timber. As used in timber survey, a size class definition; trees 5.0 to 8.9 inches (varies by species) at DBH. As used in logging operations, trees from which pole products are produced, such as telephone poles, pilings, etc.

Regeneration treatment (harvest cut). Trees are removed from the stand to create conditions that will allow the forest to renew or reproduce itself. This is accomplished under either an even-aged management system or an uneven-aged management system.
The four basic methods used to regenerate a forest are clearcutting, seed-tree, shelterwood, and selection (group selection or single tree selection).

Regeneration methods. Timber management practices employed to either regenerate a new stand (regeneration cutting) or to improve the composition and increase the growth of the existing forest (intermediate treatment).

Regulated Hunting/Fishing/Trapping. The harvest of wildlife under regulations stipulating setting of seasons, time frame of lawful harvest, open and closed zones, methods of take, bag limits, possession limits, and reporting or tagging of species.

Release (release operation). The freeing of well-established cover trees, usually large seedlings or saplings, from closely surrounding growth.

Removal cut. The final cut of the shelterwood system that removes the remaining mature trees, completely releasing the young stand. An even-aged stand results.

Salvage Cutting. The removal of dead, dying, and damaged trees after a natural disaster such as fire, insect or disease attack, or wind or ice storm to utilize the wood before it rots.

Sanitation cutting. The removal of dead, damaged, or susceptible trees to improve stand health by stopping or reducing the spread of insects or disease.

Sapling. As used in timber surveys, a size class definition. A usually young tree larger than seedling but smaller than pole, often 1.0 to 4.9 inches at DBH.

Seedling. A very young plant that grew from a seed.

Seed-Tree (Seed Cut) method. The removal of most of the trees in one cut, leaving a few scattered trees of desired species to serve as a seed source to reforest the area.

Seral. *From sere, a* series of ecological communities formed in ecological succession.

Shelterwood method. A series of two or three cuttings which open the stand and stimulate natural reproduction. A two cutting series has a seed cut and a removal cut, while a three cutting series has a preparatory cut, a seed cut, and a removal cut.

Silvicultural systems. A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration and according to the type of forest thereby produced.

Single tree selection method. Individual trees of all size classes are removed more or less uniformly throughout the stand to promote growth of remaining trees and to provide space for regeneration.

Site Preparation. Hand or mechanical manipulation of a site, designed to enhance the success of regeneration.

Snag. Includes standing dead or partially dead trees that are at least 6 inches in diameter at breast height (DBH) and 20 feet tall.

Softwood. A coniferous tree. Softwood trees belong to the botanical group gymnospermae, including balsam fir, red spruce, and hemlock.

Special use. Lands that are leased or designated for a specific purpose, usually beyond the scope of normal department operations.

Stand improvement. An intermediate treatment made to improve the composition, structure, condition, health, and growth of even or uneven-aged stands.

Stewardship. Caring for land and associated resources with consideration to future generations.

Sustainability. The production and use of resources to meet the needs of present generations without compromising the ability of future generations to meet their needs.

Sustained yield. The yield of forest products that a forest can continuously provide at a given intensity of management.

Thinning. Removing some of the trees in a dense immature stand primarily to improve the growth rate and form of the remaining trees and enhance forest health.

Threatened species. A species listed on the state or Federal threatened species list. Threatened species are those likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

Timber lands. Properties that are managed primarily for the maximum production of forest products.

Timber Stand Improvement. Activities conducted in young stands of timber to improve growth rate and form of the remaining trees.

Traditional uses. Those uses of the forest that have characterized the general area in the recent past and present, including an integrated mix of timber and forest products harvesting, outdoor recreation, and recreation camps or residences.

Uneven-aged (All-aged) system. Timber management which produces a stand or forest composed of a variety of ages and sizes. Regeneration

cutting methods in this system include single tree selection and group selection.

Watershed. The geographic area within which water drains into a particular river, stream, or body of water. A watershed includes both the land and the body of water into which the land drains.

Weeding (cleaning). Regulating the composition of a young stand by eliminating some trees and encouraging others, and also freeing seedlings or saplings from competition with ground vegetation, vines, and shrubs.

Wilderness. Areas having pristine and natural characteristics, typically roadless and often with some limits on uses. (This is not the federal definition of wilderness.)

Wildlife habitat. Lands supplying a critical habitat need for any species of wildlife, especially that which requires specific treatment and is of limited acreage.

Working forest. Land primarily used for forestry purposes but also available for recreation, usually where both managed land and land not presently being managed is present.

Working landscape. A landscape dominated by land used for agricultural and/or forestry purposes.

APPENDIX F

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APPENDIX G

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