Protecting and Restoring Wetlands, Streams, and Riparian Habitats

GOAL

Protect, conserve, and restore Lake Champlain Basin wetlands, streams, and riparian habitats and the functions and values they provide.

NYSDEC

A viewing platform at the NYSDEC's AuSable Marsh Wildlife Management Area was developed with a LCBP Local Implementation grant and Pittman-Robertson funds.

Wetlands are a vital part of Lake Champlain's ecosystem. In addition to providing critical habitat and nourishment for fish and wildlife, the more than 300,000 acres of wetlands in the Lake Champlain Basin improve water quality by filtering sediments, pollutants, and nutrients. Wetlands also help control flooding, protect groundwater and drinking water supplies, stabilize shorelines, prevent erosion, and provide recreational opportunities. Lake Champlain wetlands support extensive wildlife and fisheries resources. For example, Lake Champlain is part of the Atlantic Flyway, a migratory corridor for waterfowl and other wetland birds. Between 20,000 and 40,000 ducks and geese that depend on the Lake for critical resting and feeding sites have been counted during October flights. The Lake Champlain Basin includes some of the highest quality wetlands in the northeastern United States, including exceptional and extensive lakeside wetland complexes and the red maple-northern white cedar swamps along Otter Creek in Vermont. The Basin also includes many rare or declining natural wetland communities, including riverine and lakeside floodplain forests, wet valley clayplain forests, fens, and buttonbush swamps. Despite federal, state, and local wetlands protection regulations, threats to wetlands in the Lake Champlain Basin persist. Many people remain unaware of the function and benefits of wetlands; as a result, wetlands are often drained or filled for agricultural, residential, or commercial purposes.

Human impacts on stream and riparian habitats have also been severe and wide ranging. The view many people have of local streams is sometimes a distorted one because they often see unstable conditions altered by a history of continuous human impacts. For the last three centuries, people have altered the landscape and the flow of streams and rivers for flood control, bridges and roads, power generation, agriculture, development, and even erosion control or bank stabilization. Adverse impacts include loss of historic floodplain, increased river channel instability, degradation of water quality, decreased water storage and conveyance capacity, loss of habitat for fish and wildlife, and decreased recreational and aesthetic value. Unfortunately, most past stream manipulation did not take into consideration the natural dynamic processes at work in the stream channel, riparian habitat, and floodplain, or the need for streams and rivers to transport both flow and sediment. Stream and riparian habitat restoration is a complex effort that requires

MRBA

Projects such as this streambank planting by volunteers from the Missisquoi River Basin Association are vital to restoring riparian habitats and reducing erosion.

an understanding of the structure and functions of the natural stream system, recognition of the human induced disturbances preventing recovery to a sustainable condition, and effective implementation of a broad range of actions designed to enable streams to recover as much of their natural functions as possible. Important considerations in this process include watershed and sub-watershed level assessment, identification of reference sites, developing clear and achievable goals, eliminating or remediating indirect impacts, establishing pre- and post-project monitoring, and minimizing the need for ongoing site maintenance.

Adequate riparian buffers are one of the most effective tools for limiting nonpoint sources of pollution and promoting the long-term stability of streambanks and channels. The pollution prevention capacity of buffers is enhanced through land grading, planting of additional vegetation, and protecting and maintaining a river's access to its floodplain. Planting and maintaining riparian buffer strips help protect wildlife corridors by providing food, cover, and thermal protection to the stream. Well-vegetated riparian areas trap and filter sediments, nutrients, and chemicals and help maintain the hydrologic and ecological integrity of the stream channel and streambank. The amount of light striking the stream surface also greatly affects the type and amount of algal production in a stream. Streams in deforested areas contain a different community of plants and animals, including different fish species. Tree removal results in loss of root systems that stabilize the streambank. This can increase sedimentation, which then degrades fish spawning habitat and limits growth and reproduction rates.

ISSUES

Wetland Restoration and Permanent Protection

Because wetlands provide critical functions which range from improving water quality in the Lake Champlain Basin to providing important habitat for wildlife, existing wetland acreage needs protection. Nationally, more than 50% of the wetlands resource base has been lost. Approximately 35% of Vermont's wetlands have been lost since European settlement, and an estimated 40 acres continue to be lost each year. Estimates of wetland loss in the New York portion of the Basin are similar to national trends except within the Adirondack Park, where less than 10% of the wetlands have been lost. However, in some areas of New York significant wetlands loss has been documented. A study of Lake George shoreline wetlands for the period of 1950-1978 indicated that more than half the wetlands had been lost. The acquisition and restoration programs currently underway in the Basin are an important nonregulatory approach to wetlands protection and conservation.

Implementation of Effective Stream Restoration Projects

Flooding, channel straightening, agriculture, and transportation have long impacted the streams and rivers of the Basin. A coordinated Basin-wide stream restoration program is needed to ensure that projects are completed using the best science available and that the highest priority projects are undertaken first. Restoration and stabilization of streams requires an understanding of physical stream dynamics, as well as the needs and requirements of people living in the Basin.

Successful stream channel and riparian management efforts can benefit from a four-stage approach: 1) protection of stable stream sections where the river channel is relatively undisturbed and the riparian vegetation relatively intact; 2) identification and management of strategic sites that could, if disturbed, result in widespread instability or erosion within a watershed; 3) restoration of stream sections that have a high potential for recovery; and 4) education of the public and agencies on river processes. Stream and riparian restoration projects should be based on local data that describe stream drainage area, channel geometry, stream velocity and discharge, and background data on stable local stream systems that can be used for reference in the design of restoration projects.

OBJECTIVES

(not listed in priority order)

1) Achieve no net loss of the remaining Lake Champlain Basin wetlands and increase the quantity and quality of the wetlands resource base over the long-term.

2) Complete an up-to-date and standardized inventory and classification of wetlands in the Lake Champlain Basin.

3) Develop a coordinated approach to protecting and managing wetlands, streams, and riparian habitats in the Lake Champlain Basin.

4) Expand wetlands acquisition, riparian habitat protection, and stream restoration programs in cooperation with willing landowners in the Lake Champlain Basin.

5) Restore rivers, streams, and surrounding floodplains using approaches that work with natural stream processes and dynamics and emphasize natural community restoration by using native species from local sources.

6) Promote the development of regional or local watershed plans that build upon advanced identification and protection of wetland and riparian habitats.

7) Understand the role of wetlands, floodplains, and riparian habitat in improving water quality, stream stability, fish and wildlife habitat, erosion control, and other functions; the impacts of land use on the ability of wetlands, streams, and riparian habitats to provide important functions; and the cumulative impacts of habitat loss and alteration in the Lake Champlain Basin.

8) Improve public understanding of the importance of wetlands and riparian habitats, natural communities, and the programs designed to protect these resources.

9) Improve understanding of state and federal wetland regulations and their impact on landowner activities.

Restoration and Maintenance of Riparian Habitat

Riparian corridors are an important component of lake, stream, and river ecosystems. They help maintain stable rivers and streams, provide important functions for wildlife and aquatic organisms, and enhance the aesthetics of the rural landscape. These corridors have been degraded over time by agriculture, forestry, and development. Sufficient financial and technical incentives need to be established to encourage private landowners throughout the Basin to restore these ecosystems. A coordinated effort is needed to identify and set priorities for stream and river reaches in need of restored riparian buffers.

Stream channel stability and ecological function depend on the condition of the adjacent riparian habitat. Streams with wide and mature riparian vegetation (likely forested) exhibit greater levels of river channel stability, lower rates of bank erosion, and are often narrower and deeper. These characteristics provide optimal enhanced habitat for aquatic organisms. Restoration of moderate or severely degraded sites involves changes to channel and floodplain structure and function to achieve stream stability. Incentive-based initiatives, working in conjunction with private landowners, municipalities, regional planning commissions, and others are ideal for protecting and restoring riparian habitat.

Adopting Local Watershed Approaches to Protecting Wetlands, Restoring Streams, and Creating Riparian Buffers

Because wetland loss, stream degradation, and loss of riparian habitat are often incremental, involving a series of changes to natural systems which add up to a significant loss over time, municipalities need to be fully aware of the locations, functions, and values of wetlands, streams, and riparian corridors within their communities. Local watershed approaches should increase public awareness of the values of wetland and stream habitat, improve their protection, and provide more certainty and local expertise to communities in local planning and permitting processes.

High Priority Actions

(not listed in priority order)

1) Continue to Secure Funding and Implement the Lake Champlain Wetlands Acquisition Strategy

Additional funds should be sought through the North American Wetlands Conservation Act for the Lake Champlain Wetlands Acquisition Strategy. Funding applications should be submitted to implement the strategy fully. Wetland acquisitions resulting from this action will be consistent with the New York State Open Space Conservation Plan in the New York portion of the Basin and the Vermont Wetlands Conservation Strategy in Vermont. Public agencies, private nonprofit organizations, and willing landowners have a role in implementation.

Potential key LCBP partners: TNC, NYSDEC, VTANR, QC MENV, USFWS
Cost estimate: $1.1 million has been spent to date on this effort; an additional $1.1 million is needed for completion of the acquisition strategy
Potential funding sources: USFWS (North American Wetlands Conservation Act funding), various state and private funding sources, such as the Migratory Bird Stamp Fund and EQBA/EPF (NY)
Timeframe: Ongoing
Benchmark: Protection of 9,000 acres of wetlands

2) Update Wetland Inventory Maps Using Current Land Cover Data

Because the National Wetlands Inventory (NWI) maps for many areas of the Lake Champlain Basin are almost 20 years out of date, an ongoing program to update these maps to reflect changes in the distribution of wetlands needs to be established over time. There is also a need to inventory, map, and classify unique wetland habitats which fall below the NWI threshold throughout the Basin. Substantial progress has been made on wetlands inventory mapping in New York. The LCBP has funded updates of maps to NWI standards for wetlands in New York outside of the Adirondack Park. Completion of digitized wetlands maps within the Park remains a high priority. In Vermont, outstanding issues regarding the consistency of updated NWI maps and older regulatory maps—should be addressed through map updates. This program should be implemented using up-to-date remote sensing imagery and related technologies, assisted by field verification.

Potential key LCBP partners: NYSDEC, APA, VTANR, USFWS, LCRC
Cost estimate: $50,000 per year
Potential funding source: Federal appropriations
Timeframe: Ongoing
Benchmark: An updated wetland inventory map showing, where possible, changes in wetland distribution over time

3) Expand Wetland Restoration Efforts in the Basin

The Lake Champlain Basin Program began sponsoring a Basin wetland restoration project in 1993. The project is modeled after the USFWS Partners for Fish & Wildlife program, and is being implemented with funding from the USEPA and technical assistance from the USFWS, NYSDEC, and VTANR (see Figures 6 and 7). Under this action, an expanded wetland restoration program should be carried out through cooperative efforts among government agencies and private partnerships. The expanded program should focus on the conservation of biological diversity through careful selection, design, and implementation of wetland restoration projects. Future efforts will require securing adequate funds and continuing to identify willing landowners. The program should also include development of maps that identify potential candidate sites for restoration projects. The US Department of Agriculture's (USDA) Natural Resource Conservation Service (NRCS) has been implementing the Wetland Reserve Program in both Vermont and New York since 1996. Similar projects are slated to be developed in Québec through cooperative efforts among government agencies, local associations, private partnerships, and municipalities.

Potential key LCBP partners: USFWS, NYSDEC, VTANR, USDA-NRCS, USACOE, QC MAPAQ, QC MENV, QC SFP, TNC, Ducks Unlimited, watershed associations, landowners
Cost estimate: $80,000 to $100,000 per year for projects; $50,000 per year for project oversight and technical assistance by a staff biologist
Potential funding sources: USFWS (Partners for Fish & Wildlife Program), USDA (Wetlands Reserve Program and Conservation Reserve Program)
Timeframe: Ongoing
Benchmark: Restoration of 100 to 500 acres of wetlands annually

4) Expand NRCS/FSA, USFWS, and Other Agency Cost-Sharing Programs for Stream Restoration, Riparian Habitat Protection, and Installation of Riparian/ Wetland Buffer Strips

Develop or expand programs that cost-share or offer tax rebates for the voluntary restoration or protection of buffer strips on perennial streams, rivers, and lakes.

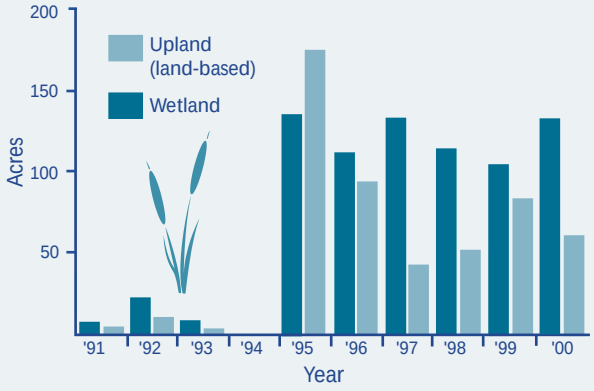

Figure 6. Upland and wetland habitat restoration in the Lake Champlain Basin through the USFWS Partners for Fish and Wildlife Program, 1991-2000. Source US Fish & Wildlife.

Potential key LCBP partners: USDA-NRCS, USDA-FSA, USFWS, USACOE, NYSDEC, VTDEC, VTDAFM, NYSAM, QC MENV, QC SFP, QC MAPAQ, municipalities, conservation districts, watershed associations
Cost estimate: $500,000 to $1 million per year
Potential funding sources: Federal appropriations, community development grants, land trusts, EQBA/EPF (NY)
Timeframe: Ongoing
Benchmark: Identification and provision of funding for streambank restoration and the installation of buffer strips

5) Develop and Provide Training in Field Assessment Protocols for Managers and Local Watershed Organizations

Effective geomorphic assessment requires consistent protocols that can be used by managers and citizen groups with minimal technical assistance and training. These protocols should provide instructions for: a) identifying stable stream reference sites; b) locating unstable stream channels in need of restoration; and c) setting priorities for stream corridors and floodplains in need of protection.

Potential key LCBP partners: USDA-NRCS, USDA-FSA, USFWS, USFS, NYSDEC, VTDEC, VTFWD, QC MAPAQ, QC MENV, LCRC, municipalities, NY counties, conservation districts, watershed associations
Cost estimate: $50,000 for training program; $100,000 to develop regional database
Potential funding sources: Federal and state appropriations
Timeframe: Ongoing
Benchmark: Development of a stream geomorphic handbook, based on regional hydrologic geomorphic data; Basin-wide shared database for river restoration practitioners; regularly scheduled training on stream morphology assessment techniques to agency personnel, watershed organizations, and other parties

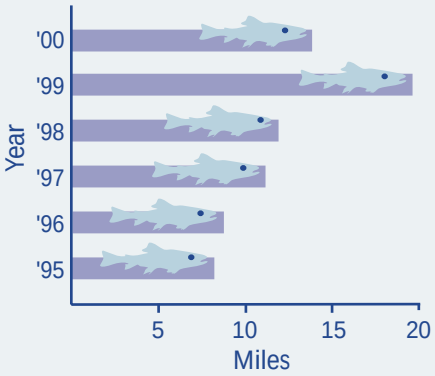

Figure 7. Miles of stream banks restored in the Lake Champlain Basin through the USFWS Partners for Fish and Wildlife Program, 1995-2000. Source US Fish & Wildlife.

6) Promote Local Watershed Planning throughout the Basin

Local approaches at the watershed level can be used to identify and protect wetlands, stream, and riparian habitats in advance of permit applications. This approach should include:

a) Assess wetland and stream functions and values, current conditions, and sensitivity to change.

b) Use results of natural heritage and biological surveys of the Basin to determine important and unique wetlands, stream segments, and riparian habitats, including those that provide vital habitats for rare, threatened, and endangered species; birds, reptiles, amphibians, and invertebrate species (such as mussels); and significant natural communities. Complete surveys as necessary.

Accomplishments

Acquiring Wetlands

The LCBP sponsored a wetland acquisition strategy that laid the groundwork for a four-phase, multiyear program to permanently protect almost 9,000 acres of wetlands in the Champlain Valley. The Nature Conservancy is the lead agency for the project. To date, the North American Waterfowl Conservation Act, administered by the US Fish and Wildlife Service, has provided $1.4 million to the project, which has conserved 4,000 acres of wetlands and surrounding areas in close cooperation with local communities in New York and Vermont.

Establishing Ecological Preserves

In Québec, volunteers have worked with the Ministry of Agriculture, Fisheries, and Food to restore streambanks along the Pike River. The first phase of the Pike River Ecological Preserve was also initiated, and included working with local landowners to protect more than 311 acres (126 hectares) of wetlands in the delta of the Pike River in Missisquoi Bay.

Restoring Stream Habitat

In New York, a major stream restoration effort is being conducted on the AuSable River under funding through the State Clean Water/Clean Air Bond Act.

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c) Assess the impacts of cumulative wetland, stream, and riparian habitat gains/losses in the watershed.

d) Assist communities with local planning, model wetland protection ordinances, and local zoning regulations for protecting wetlands and other critical habitats.

e) Provide funding for implementation projects by watershed organizations.

Potential key LCBP partners: Federal, state, provincial, and local agencies, as well as nonprofit watershed organizations
Cost estimate: $50,000 to $100,000 per year
Potential funding sources: USEPA, VTDEC, NYSDEC, federal appropriations, in-kind services
Timeframe: 3 to 5 year demonstration projects
Benchmark: Development of watershed level geomorphic assessment handbook (see Action #5 above); completion of one local watershed plan per year

Priority Actions

(not listed in priority order)

7) Develop Incentives for Local Municipalities and Private Landowners to Restore, Enhance, and Maintain Wetlands and Stream Corridors

Tax incentives are another way to encourage private wetlands and stream protection and restoration efforts. Under this option, a task force would be established to develop legislation to alleviate part of the tax burden for landowners who practice habitat conservation.

Potential key LCBP partners: NYSDEC and VTANR
Cost estimate: In-kind services of state agencies
Potential funding sources: Federal and state appropriations
Timeframe: Ongoing
Benchmark: A task force report identifying draft state legislation to alleviate tax burden for landowners

8) Increase Funds and Technical Resources for Local Governments to Implement BMPs for New Development Which Will Protect Wetlands, Stream Corridors, and Riparian Habitat

Encourage local governments to:

a) Improve stormwater management through local zoning and subdivision regulation, and appropriate use of the National Pollutant Discharge Elimination System (NPDES) and State Pollution Discharge Elimination System (SPDES) including EPA Phase II stormwater regulations.

b) Emphasize erosion hazards, floodplain functions, sedimentation controls, habitat protection, and use of natural vegetation as requirements in local zoning and subdivision regulations.

c) Apply infiltration and other BMPs in new developments.

d) Apply surface water setbacks and buffer strips in new developments.

e) Employ appropriate growth management options.

f) Assess cumulative impacts of new development.

g) Promote innovative site design that reduces creation of impervious surfaces.

h) Promote road maintenance standards for sediment control and initiate training programs for town highway departments to minimize impacts of road maintenance activities on water quality, streambank stability, and native wetland species.

Potential key LCBP partners: Municipal governments, NYSDEC, VTDEC, regional planning commissions, county planning offices, private developers
Cost estimate: In-kind participation of agency representatives
Potential funding sources: Federal and state appropriations, in-kind services from state and local government
Timeframe: Ongoing
Benchmark: Improved implementation of BMPs at the local level

9) Encourage Cooperative Development of Local Shoreland Restoration and Protection Tools

Encourage continued coordination among government, academic, and private institutions to develop and publicize shoreland restoration and protection methods that can be adapted to the local level. A number of the activities listed here are currently underway (e.g., within the VT Department of Environmental Conservation Water Quality Division). This action is to support the continuation and expansion of these activities in both Vermont and New York.

Elements could include:

a) Convene various groups with expertise to summarize the best management practices and shoreland protection and restoration tools available.

b) Publicize and distribute guidelines for communities, organizations, and individual landowners on how, when, and where to use different methods and techniques.

c) Make available model shoreland management plans that can be used by private landowners, municipalities, and state agencies for individual properties.

d) Encourage the formation of watershed associations.

e) Support the development of volunteer programs for shoreland restoration.

f) In Québec, continue to support Coopérative de Solidarité du bassin versant de la rivière aux Brochets, a group of volunteers with the Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec (MAPAQ) to restore streambanks of the Pike River Watershed.

Potential key LCBP partners: NYSDEC, VTDEC, LCRC, Soil & Water Conservation Districts, USACOE, QC MAPAQ, Coopérative de Solidarité du Bassin Versant de la Rivière aux Brochets, LCRC, local governments and planning boards, universities
Cost estimate: $120,000 per year for staff support and printing manuals
Potential funding sources: USEPA, USACOE, state appropriations
Timeframe: 2001-03
Benchmark: Provision of technical assistance to shoreland communities, watershed associations, and landowners in shoreland protection

ACCOMPLISHMENTS

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Under the Bond Act, $15 million has been dedicated to implementation of the Lake Champlain management plan, with a portion of the funding allocated to habitat restoration efforts. A segment of the AuSable River in Keene was selected for habitat restoration funds. The project is in the planning phase with assessment of stream morphology and design of restoration techniques.

Assessing Stream Stability

With multiple federal, state, and local partners, the LCBP supported a stream stability assessment and demonstration project on the Trout River, an area severely affected by a 500-year flood in 1997. The project and subsequent follow-up work used natural channel design techniques to reduce future habitat loss, erosion, and flooding downstream. Similar projects have also begun in other parts of the Basin, including portions of Lewis Creek and the Boquet River.

10) Assess the Contribution of Sediment Transport from Streambank Erosion and Shoreline Construction Activities to the Phosphorus Loads Entering Lake Champlain

Shoreline erosion and sediment transport add phosphorus to Lake Champlain. However, current research is inconclusive regarding how much of this phosphorus contribution effects water quality. Much of the nutrient load reaching the Lake may be bound to sediment particles and may not be available within the food chain. Additional research will help us better understand how sediment adds to phosphorus loads to the Lake, how much of this phosphorus contributes to algae growth, and how nutrients are dispersed by wave and water movement within and between lake segments.

Potential key LCBP partners: VTDEC, NYSDEC, USEPA, QC MENV, research community
Cost estimate: $80,000 to $150,000 for initial research on sediment transport
Potential funding sources: Federal and state appropriations
Timeframe: Ongoing
Benchmark: Improved phosphorus modeling capabilities and targeting of priority streambank stabilization and shoreline erosion control projects

11) Develop Sediment and Temperature TMDL Implementation Strategies for Rivers That Contribute Major Sediment Loading to Lake Champlain or Which Have Been Identified on the States' Lists of Impaired Waters Due to Water Temperature Problems

A number of tributaries entering Lake Champlain are impaired due to sediment and/or temperature levels. The VTDEC has initiated identification of a Total Maximum Daily Load (TMDL) to reduce water temperature in the Poultney River. The VTDEC and NYSDEC need to collect data, assess alternatives, and initiate mitigation strategies for other tributaries impaired by sedimentation or other negative impacts. Elements of this action include:

a) Develop an improved means of measuring and predicting bank erosion and related sediment loading of streams in the Basin.

b) Develop a strategy for protection of riparian habitat integrity that considers current stream conditions, and that recognizes likely future responses to modifications of the character of the floodplain or stream channel.

c) Complete the development of TMDL documents concerning sediment loads and/or temperature problems in the Basin.

d) Support the implementation of sediment and temperature TMDLs with demonstration projects where appropriate.

Potential key LCBP partners: VTDEC, NYSDEC, USEPA, NRCS, watershed organizations
Cost estimate: $100,000 each for demonstration projects in New York and Vermont
Potential funding source: Federal and state appropriations
Time frame: Ongoing
Benchmark: Completion of temperature and sediment TMDLs where required in the Lake Champlain Basin

12) Assess Potential Impacts of Dam Operation and Removal on Stream and Wetland Structure and Functions

Operation of hydropower and other dams can have major impacts on habitat and fish survival and migration to upstream habitats if they do not adequately take into account how water withdrawal and release impacts stream conditions. Removal of old dams can also create negative impacts by releasing large amounts of sediments that have collected behind the dam over many years. These sediments may contain contaminants. Carefully assessing how human-made impoundments impact the natural processes and functions of streams and rivers and ensuring that the natural system is restored as soon as impoundments are removed are important.

Potential key LCBP partners: VTDEC, NYSDEC, USFWS, USACOE
Cost estimate: $50,000 per year in each state
Potential funding sources: Federal and state appropriations
Timeframe: Ongoing
Benchmark: Completion of Basin-wide assessment of power generation and dam removal, and removal of dams where feasible