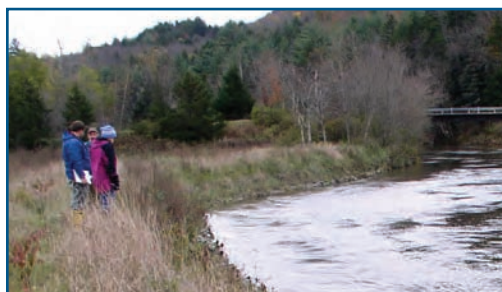


# Federal Actions and Opportunities

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*Activities of Federal Agencies in Partnership to Protect Lake Champlain*

For more information about the agencies  
and activities listed in this report, or for  
contact information for the LCBP Federal  
Agencies Working Group, contact:

Lake Champlain Basin Program  
54 West Shore Rd.  
Grand Isle, VT 05458

802/372-3213  
800/468-5227 (NY & VT only)

[www.lcbp.org](http://www.lcbp.org)

For an electronic copy of this publication and further information,  
visit the following Website:

[http://nh.water.usgs.gov/champlain\\_feds](http://nh.water.usgs.gov/champlain_feds)

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*Charles Schumer*

*Senator Charles Schumer*

*Patrick Leahy*

*Senator Patrick Leahy*



*We support the efforts of the Federal Partners for Lake Champlain as they collaborate for the benefit of the people and ecosystem of the Basin. We greatly appreciate the work of so many dedicated Federal public servants to protect and restore this local, regional, national, and international gem. Through cooperation, teamwork, and coordination these Federal agencies will continue to play a huge role in implementing Opportunities for Action: An Evolving Plan for the Lake Champlain Basin.*

*Jim Jeffords*

*Senator James Jeffords*

*Hillary Rodham Clinton*

*Senator Hillary Rodham Clinton*

EPA/ERIK H. BECK



Wintertime ferry leaving Grand Isle, Vermont, for Plattsburgh, New York.



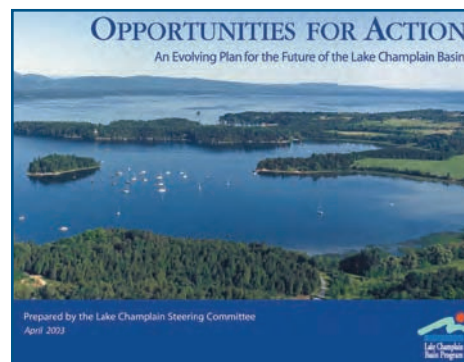
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## *Overarching Federal Agency Support By the Environmental Protection Agency*

The Environmental Protection Agency (EPA) is responsible for core administrative and technical support affecting all of the Lake Champlain Basin Program (LCBP). EPA provides funding through its annual appropriation to support activities identified by the Lake Champlain Steering Committee. This funding supports coordination of activities implementing the Lake Champlain Management Plan, *Opportunities for Action*, throughout the Lake Champlain Basin, including the work of two countries, one province, two states, and several state, provincial, and Federal agencies. These initiatives fall into the following categories: reducing phosphorus pollution; preventing pollution from toxic substances; protecting human health; managing fish and wildlife; protecting and restoring wetlands, streams and riparian habitats; managing nonnative aquatic nuisance plants and animals; managing recreation resources; informing and involving the public; building local-level implementation; measuring and monitoring success; and economics in the Lake Champlain Basin.

Many other Federal agencies also work to implement *Opportunities for Action*. To facilitate their mutual cooperation, several agencies established a Federal workgroup and signed a *Memorandum of Understanding* regarding their work to implement the management plan. This document summarizes the recent plan implementation efforts of each participating agency.



View the plan online at  
[www.lcbp.org](http://www.lcbp.org).

# Reducing Phosphorus Pollution

*Reduce phosphorus inputs to Lake Champlain to promote a healthy and diverse ecosystem and provide for sustainable human use and enjoyment of the Lake.*

## KEY FEDERAL ACTIONS

### Environmental Protection Agency

The Environmental Protection Agency (EPA) provides funding for Total Maximum Daily Load (TMDL) development, the Clean Water Act Section 319 (non-point source) program, state water-quality standards development, the Clean Water State Revolving Fund (SRF) programs, and special projects as funded by Congress. These programs are implemented through the Vermont Agency of Natural Resources (VT ANR) and the New York Department of Environmental Conservation. Funding is provided for upgrading wastewater treatment facilities throughout the Lake Champlain Basin to reduce phosphorus from point sources. Interested parties can contact these agencies for the availability of funds. Loans have been awarded through the SRF in New York and Vermont.

Additionally, EPA is funding several initiatives to control stormwater and septic system pollution. For example, in the Potash Brook watershed, EPA is funding a grant that will demonstrate innovative stormwater and stream stabilization practices. Work in this small watershed will involve several partners, including the City of South Burlington, the VT ANR, and the University of Vermont (UVM), and will include a public education component. EPA is also funding stormwater research by the UVM that will result in stormwater management tools for individuals, developers, municipalities and policy makers. EPA is funding another stormwater project in Chittenden County, as well as an onsite wastewater demonstration project.

### Natural Resources Conservation Service

The Natural Resource Conservation Service (NRCS) provides technical and financial assistance to farmers and other rural landowners to protect and restore natural resources such as water quality.

Under the Farmland and Ranchland Protection Program (FRPP) NRCS provides funds to the Vermont Housing and Conservation Board and the Vermont land trusts to purchase the development rights on farmland. Since urban built-up land contributes more non-point phosphorous pollutants than does agricultural land, this program will help to avoid increases in phosphorous loading to the Lake. Since 1997 FRPP has provided \$13,017,210 (matched with state and land trust dollars) for the conservation of 30,304 acres of farmland located in the Lake Champlain Basin.

In New York FRPP provided \$278,010 for the purchase of development rights on the 1,615 acre Rovers Farm in Chazy. The funding will be matched with state dollars to purchase a perpetual conservation easement to ensure that the land will stay in farming forever.

BOB SYLVESTER/NRCS



NRCS built this waste storage pond at Foster Brothers Farm in Middlebury, Vermont, to collect phosphorus runoff from compost.

The Environmental Quality Incentives Program (EQIP) provides financial and technical assistance to agricultural producers to protect water quality and other natural resource concerns. From 2004 to 2006 NRCS provided \$8,498,000 in funding for this program in the Vermont portion of the Lake Champlain Basin. Higher priority was given to impaired waters, and \$4,558,000 or 53% of the total funding for the Basin was allocated to the Missisquoi and St. Albans Bay watersheds. Much of the money was allocated for animal waste management practices such as manure storage and nutrient management. During this three year period a total of approximately 18,000 acres of nutrient management was applied in the Basin due to EQIP.

USGS



Streamflow measurement at Englesby Brook in Burlington, Vermont.

Over the last three years, \$1,784,945 in EQIP federal financial assistance has been provided to farmers in the Lake Champlain Basin in New York. These funds are used for the construction of best management practices such as erosion control practices, manure storage structures, milkhouse waste treatment systems, barnyard water management systems and implementation of nutrient and pest management practices in the Basin. As a result of this program, NRCS staff provided technical assistance for the following practices which have been installed on the New York side of the Basin:

- Four Concentrated Animal Feeding Operations (CAFO) size manure storages in Clinton County and two CAFO size manure storages in Washington County—the storages allow farmers to manage their manure in accordance with nutrient management guidelines, and their Comprehensive Nutrient Management Plan (CNMP);
- Four covered barnyards in Clinton County—the “roof structures” keep outdoor livestock loafing areas dry, preventing rainfall and runoff from washing nutrients from the barnyard;

- 12,350 feet of diversions and grassed waterways—diverting clean water away from barnyards and filtering out sediment and nutrients from runoff;
- 225 acres of strip cropping—reducing erosion and improving soil organic matter and soil health;
- 500 acres of new rotational grazing systems in Clinton and Essex Counties—livestock harvest forages and disperse animal manures to the land in a sustainable process; new fencing keeps livestock out of streams and riparian areas, protecting fragile stream banks from erosion, eliminating nutrients and sediments from these areas;
- Nine CNMPs prepared—for the management of livestock operations in New York;
- Five agricultural fuel storage systems have been constructed—to prevent ground and surface water contamination by agricultural fuels used in the barnyard area.

The Conservation Reserve Enhancement Program (CREP) is used to install buffers on rivers, streams and lakes. It is administered by the U.S. Department of Agriculture (USDA) Farm Service Agency and the Vermont Agency of Agriculture, with technical assistance provided by NRCS. This program, funded with approximately \$2,500,000 from USDA and \$800,000 from the State of Vermont, has resulted in over 1,330 acres (approximately 115 miles) of new riparian buffers in the Lake Champlain Basin, reducing edge-of-field delivery of pollutants to water bodies.

In the past five years, NRCS has received Congressional earmarks to assist producers in piloting new alternative technologies to address animal waste issues. Since then, \$1,780,000 of NRCS funds have been used to demonstrate new manure management technologies. In 2004 NRCS entered into an agreement with the Poultney/Mettowee Natural Resources Conservation District (NRCD) to coordinate the projects and the Vermont Agency of Agriculture which contributes additional funds.

NRCS in Vermont also provided technical assistance to the Winooski NRCD in implementation of an EPA-funded Clean Water 104(b) work plan for Implementing Urban Stormwater Management Practices in the Potash and Allen Brook watersheds.

In New York's South Lake area (Washington County) a 277-acre Grasslands Reserve Program (GRP) grazing contract was funded for rotational grazing and delayed haying and pasturing. Rotational grazing will allow the farmer to more efficiently manage pasture resources, while managing manure and preventing nutrients from entering the stream. Delayed haying and pasturing will protect the nests and fledglings of ground nesting songbirds.

### **U.S. Geological Survey**

The U.S. Geological Survey (USGS) is conducting a long-term (1999–2010) study of the efficacy of urban best management practices (BMPs) in reducing phosphorus and sediment loads to Lake Champlain. This project investigates changes in water-quality conditions on Englesby Brook in Burlington, where the City of Burlington is utilizing funding from the Pine Street Barge Canal Superfund settlement to implement a number of urban BMPs. Water-quality sampling is conducted monthly and during storm events. Total funding for the project is estimated at \$950,000, with 2004 funding at \$139,000.

The USGS operates a network of 49 streamflow, lake, and reservoir gaging stations in the Lake Champlain Basin of Vermont and New York. Three lake gages and 17 tributary streamflow stations directly support water-quality studies in the Lake Champlain Basin. Since 2004, three gages have been established with various partners in Vermont to support stormwater management activities; they include Potash Brook in South Burlington, Allen Brook in Williston, and on Stevens Brook in St. Albans. Real-time data from this network also support flood forecasting, warning, and recreational uses. Long-term data from the network provide for improved knowledge of basin hydrology and streamflow characteristics needed for design and management decisions and flood hazard mitigation. USGS funding for the basin-wide network is \$480,000 in 2006.

### **National Oceanic and Atmospheric Administration**

With funding from the National Oceanic and Atmospheric Administration (NOAA), the Lake Champlain Sea Grant (LCSG) research initiative is providing urban watershed pollution prevention, reduction, and education activities to assist residents, local officials, businesses, and volunteer organizations to reduce phosphorous and other non-point source (NPS) pollutants from residential, institutional and business properties. Sea Grant is a partner in multiple education activities in the basin, working with local officials and volunteer organizations that have reduced fertilizer and other inputs in Englesby Brook, Burlington; Stevens and Ruggs Brook, St. Albans; and Mallets Bay, Colchester, Vermont. Sea Grant is the local partner in the 2004–2008 USDA funded New England Regional Water Quality Program, with activities in three of the regional focus areas: NPS pollution prevention, Non-point source Education for Municipal Officials (NEMO) and Sustainable Landscapes for Water Quality Protection. Sea Grant is a partner with 12 other municipalities and management agencies in the Regional Stormwater Education Program for Chittenden County, a designated Phase II stormwater community, to increase public awareness of stormwater issues and how to reduce NPS pollution at the household level. LCSG is a collaborator on the UVM Reinventing the American Neighborhood (RAN) project working with two communities/subdivisions in South Burlington, Vermont, to develop tools and approaches for community based stormwater management. LCSG provided technical and financial support for the Northwest (Vermont) Regional Planning Commission (NWRPC) production of a shoreline stabilization handbook for Lake Champlain and other inland lakes. The guide focuses on novel bioengineering approaches to erosion control and shoreline stabilization (with attendant phosphorous reduction benefits) that integrate well with expanding efforts to increase vegetative buffers and maintain natural setback zones.

### **U.S. Army Corps of Engineers**

Section 542 of the Water Resources Development Act of 2000 authorized the Corps to establish a program for providing environmental assistance to non-Federal interests in the Lake Champlain

Basin. The goal of the program is to provide assistance with planning, designing and implementing projects that contribute to protection and enhancement of Basin water quality, water supply, ecosystem, and other water-related issues, while preserving and enhancing the economic and social character of the communities. Projects share costs: 65% Federal, 35% non-Federal. Implementation of specific BMPs will reduce phosphorus loading into the Lake. Specific projects are screened and selected by the LCBP and will be outlined in the Corps' General Management Plan (GMP) when updated in FY 2007. The initial GMP was completed in the spring of 2004 with one of the pilot projects, The Lake George Village Project, designed to reduce stormwater runoff from the large parking lot at Beach Road in Lake George Village by construction of a 'stormwater median' and infiltration chamber to intercept surface flow and reduce pollution to Lake George. The project construction was completed in November 2006. Four additional projects were selected in 2005 and are currently being negotiated or designed:

- Potash Brook: South Burlington, VT—Design/construction of urban watershed restoration measures in a crucial reach of Tributary 3 of Potash Brook. The goal is to improve the stream health, aquatic ecosystem function, and water quality prior to discharge into the main stem of Potash Brook and Lake Champlain.
- Water Pollution Control Plant: Plattsburgh, NY—Address phosphorus removal by generating a planning study which will make recommendations for more efficient phosphorus removal at the City Water Pollution Control Plant (WPCP).
- Stevens Brook: City of St. Albans, VT—Planning study will identify and prioritize storm drain retrofitting opportunities within the Stevens Brook watershed. Final phase will include the design of one project within the watershed.

- East Branch of the Ausable River: Keene, NY—Complete preliminary designs and construct river stabilization and habitat improvement measures along a 2,000 ft reach of the East Branch of the Ausable River in Keene, NY.

One additional project was selected in September 2006:

- College Street Drainage Area: Burlington, VT—Design and construction of a storm drain system upgrade. The project will result in significant improvements to the ecological health of Burlington Harbor. The College Street's drainage area consists of 75% impervious surface and is the largest (23 acres) in Vermont's most urbanized city.

## OTHER FEDERAL ACTIONS

The **U.S. Army Corps of Engineers** regulates discharges of dredged or fill material into waters, including many areas that serve as buffers to prevent runoff from flushing phosphorus into Lake Champlain and its tributaries. The EPA and U.S. Fish and Wildlife Service (USFWS) also provide reviews under this process.

The **U.S. Fish and Wildlife Service's Partners for Fish and Wildlife Program** results in substantial conservation of wetland and riparian functions, including filtering and sediment retention that reduce phosphorus inputs to Lake Champlain tributaries.

The **Natural Resources Conservation Service** technical staff continue to work with an interagency team to assist the LCBP research specialist in developing coefficients to track phosphorus reductions. The estimates derived from the coefficients will allow resource planners to determine success in meeting phosphorus reduction goals.

In 2005, the Lake Champlain Basin Program initiated an award program to recognize one farm annually in New York, Vermont, and Quebec that has made exemplary progress towards reducing agricultural pollution to the Lake.

# Preventing Pollution from Toxic Substances

*Reduce toxic contamination to protect public health and the Lake Champlain ecosystem.*

## KEY FEDERAL ACTIONS

### Environmental Protection Agency

EPA provides funding for the Superfund program at the Pine Street Barge Canal and the Plattsburgh Air Force Base (AFB), Brownfield grants, and Resource Conservation and Recovery Act (RCRA) grants and enforcement. The Agency is also involved in the lease process involving the interim and long-term use of the entire Plattsburgh AFB acreage. Additionally, EPA has listed the Commerce Street Plume site in Williston, Vermont, as a Superfund site. This addition to the National Priority List under Superfund will allow for eventual cleanup of the site.

### U.S. Fish and Wildlife Service

Environmental contaminants specialists in the Service's Division of Environmental Quality review environmental documents, legislation, regulations, and permits and licenses with pollution potential to ensure that harmful effects on fish, wildlife, and plants are avoided or minimized. These specialists work in the field on Superfund activities, natural resource damage assessments, dredging and disposal of contaminated sediments, special contaminant studies both on and off Service lands, and oil and chemical spill response.

### U.S. Geological Survey

The USGS is completing a five-year (2001–2006) study to understand of mercury (Hg) and methyl-mercury (MeHg) movement in the Lake Champlain Basin. This study has quantified the amount of Hg in river water that enters the lake and has identified

urban land uses as a large source of elemental Hg and agricultural land as a surprisingly large source of MeHg—the toxic form of Hg. This knowledge of factors controlling Hg movement in ecosystems has been incorporated to Hg mass-balance models of Lake Champlain and will help identify better management practices to mitigate Hg contamination in surface waters and fish. Total funding for the project is at \$750,000. (Funding in 2006 is \$38,000.)

The USGS initiated a two year study in 2006 to determine the presence of a new class of contaminants in the water environment—pharmaceuticals, animal and plant hormones, and other by-products of societal activities and life-styles. This new class of contaminants—referred to as organic wastewater contaminants (OWC)—is of emerging concern because little is known about their occurrence in the environment, their effects on aquatic and terrestrial ecosystems, and how to accurately measure their presence. Recently, studies throughout the United States have started to document their presence in streams and ground waters and USGS has been at the forefront of this work. Lake Champlain is an important source of drinking water, receives inputs from permitted wastewater discharges, and has high recreational value, suggesting routes by which humans and aquatic organisms could be exposed

TOM MANLEY



NOAA has supported research on the Lake hydrodynamics by Middlebury College Professor, Tom Manley (far right).

to these compounds. There is no known information on the presence, distribution, or concentrations of contaminants of emerging concern in the Lake Champlain Basin; the Basin itself represents an excellent area in which to study OWC because of the range of land uses within its boundaries—from rural forests to intensively agricultural and urban lands. Total funding for the project is \$161,000. (Funding in 2006 is \$105,000.)

### **National Oceanic and Atmospheric Administration**

Through the Lake Champlain Research Consortium, NOAA provides approximately \$200,000 annually for atmospheric and hydrodynamic research in the Lake Champlain Basin. Approximately \$100,000 supported the work of Tom Manley of Middlebury College, who continued the ongoing underwater drifters program with a number of collaborators from New York, Massachusetts, and France. Remaining resources support atmospheric and hydrodynamic research initiatives, upkeep of the Colchester Reef meteorological station, and an ongoing study of mercury transport.

The LCSG research initiative provides urban watershed pollution prevention, reduction and education activities to assist residents, local officials, businesses and volunteer organizations to reduce toxic non-point-source pollutants from residential, institutional and business properties. Education and technical support reduces pesticide, oil/grease and household chemical inputs in urban watersheds, including Englesby Brook, Burlington; Stevens and Ruggs Brook, St. Albans; and Mallets Bay, Colchester.

The NOAA Air Resources Laboratory and LCSG supported the development of a unified atmospheric deposition research and monitoring plan for the Lake Champlain watershed, including budgets, research priorities, an extension plan and a framework for interagency collaboration. These recommendations guide NOAA and other Federal deposition research and monitoring investments in the basin, especially in relation to Hg and airborne toxins.

UVM



Captain Dick Furbush, of the University of Vermont (UVM) research boat, Melosira, holds a drifter used for hydrodynamic research on the Lake.

## Protecting Human Health

*Minimize the risks to humans from water-related health hazards in the Lake Champlain Basin.*

### KEY FEDERAL ACTIONS

#### Environmental Protection Agency

EPA provides funding for the Drinking Water State Revolving Fund and funding for the implementation of the Source Water Assessment Program in the states.

Through the LCBP, EPA is funding blue-green algae research in Lake Champlain, which is being conducted by faculty at UVM. Monitoring in Lake Champlain has completed seven successful field seasons so far. A vital component of this work is to develop a consistent process for notifying Vermont, New York, and Quebec government health offices and the public about risks from blue-green algae exposure on a weekly basis. Previously, some of the parties have initiated beach closures for shared waters without the knowledge of the other parties. A new project is studying the possible impact herbicides have on increasing the concentration of blue-green algae in Lake Champlain.

A Lake Champlain Basin Program local grant to the Lake Champlain Committee is expanding an ongoing volunteer blue-green algae monitoring program.

#### OTHER FEDERAL ACTIONS

**Missisquoi National Wildlife Refuge** is participating in an effort spearheaded by the Lake Champlain Committee, in concert with the UVM, to learn more about the timing, duration, extent, and threat to humans and their pets from blue-green algal blooms in the Missisquoi Bay area.

**National Oceanic and Atmospheric Administration and the Lake Champlain Sea Grant** urban watershed pollution prevention, reduction and education activities specifically focus on reducing bacterial pollution of urban waterways by pet waste, and through malfunctioning septic systems. Recently completed research in Malletts Bay, Colchester, identified dog waste left in lakeshore yards as a likely source of bacterial contaminants. As part of the Clean New England Beaches Initiative, LCSG and EPA New England co-sponsored a workshop on reducing and preventing pathogen related beach closures on lakes and rivers in northern New England.

USFWS



A blue-green algae bloom near Phillipsburg on Missisquoi Bay (above). Blue-green algae obscures a secchi disk (right).



## Managing Fish and Wildlife

*Restore and maintain a healthy and diverse community of fish and wildlife for the people of the Lake Champlain Basin.*

### KEY FEDERAL ACTIONS

#### U.S. Fish and Wildlife Service

The Service has several programs in the Lake Champlain Basin working directly on fish and wildlife management and restoration, including fish hatchery production. The Federal hatcheries raise approximately 170,000 landlocked Atlantic salmon annually for Lake Champlain and its tributaries. In addition to its hatchery production, the Service is instrumental in cooperative efforts to

provide passage beyond dams for migratory fish, control parasitic sea lamprey, and monitor predatory and forage fish populations to support a multi-million dollar recreational fishery and the restoration of native species in the Lake Champlain Basin.

The 6,642-acre Missisquoi National Wildlife Refuge, located on the eastern shore of Lake Champlain near the Canadian border, provides habitat for a multitude of migratory birds and other wildlife. The Refuge is active in efforts to restore populations of

declining and state-listed threatened or endangered species in the watershed. Efforts to restore species such as ospreys, black terns, eastern spiny soft shell turtles, and others have been underway for many years and will continue. Missisquoi is well known for

hosting one of the largest great blue heron nesting colonies in the Lake Champlain Basin. It annually provides crucial resting and feeding habitat for tens of thousands of ducks and geese during fall migrations. Additionally, Missisquoi Refuge is participating in a research program to determine the cause and remedy for the widespread deformed frog situation.

Throughout the Lake Champlain Basin, the Service's Partners for Fish and Wildlife Program annually completes 30–40 habitat restoration projects in cooperation with landowners and Federal and state agency partners. These projects restore and protect approximately 20 miles of riparian habitat, as much as a mile of in-stream habitat, up to 500 acres of wetlands, and over 50 acres of uplands. Where opportunities exist and funding allows, the Partners for Fish and Wildlife Program also restores habitats impacted by invasive species such as purple loosestrife and water chestnut.

#### U.S. Fish and Wildlife Service and Department of State

As part of the Lake Champlain Fish and Wildlife Management Cooperative, the USFWS participates in a multifaceted approach to controlling sea lamprey populations in Lake Champlain by installing barriers to spawning migrations, trapping migrating adults, and applying target-specific pesticides, known as lampricides.

Sea lamprey control is an integral component of the USFWS's commitment toward restoring landlocked Atlantic salmon and other native species to the Lake Champlain Basin. The control program also receives significant support through the Department of State-funded Great Lakes Fishery Commission. The \$4 million program for sea lamprey control in Lake Champlain is key to

SEA GRANT



Several Federal agencies are working to control impacts from sea lamprey on the Lake's native fish.

protecting a recreational fishery that contributes over \$200 million in annual expenditures to the local economy.

### National Oceanic and Atmospheric Administration

Through the LCSG research initiative, NOAA supports research on fisheries and wildlife in the basin. The current research initiative (\$350,000 for 2005–2007) includes applied research on modeling and management of double-crested cormorants in Lake Champlain, improving management strategies to control sea lamprey populations in the basin, and quantify downstream effects of lampricide treatment on macroinvertebrate populations. Further, work has been done to determine population structure and dynamics of rainbow smelt, which is under threat from alewife, a newly arrived aquatic invasive species.

### U.S. Geological Survey

The Vermont Cooperative Fish and Wildlife Research Unit supports a variety of research in the Lake Champlain basin that provides important information for managing fish and wildlife. Recent examples include the following studies: Diet, movement, and dispersal patterns of Double-crested Cormorants (2001–2006); Landscape effects on population dynamics in birds (2001–2005); Management practices for grassland birds in forage crops (2001–2006); Population Dynamics of the Indiana Bat in the Champlain Valley (2003–2006); Investigating potential alternative control methods for sea lamprey (2004–2008); Using hydroacoustics to determine spatial distributions and relations of rainbow smelt and alewife (2007–2009); and Distribution and abundance of mudpuppies in selected Lake Champlain tributaries (2007–2009).

### OTHER FEDERAL ACTIONS

**Lake Champlain Sea Grant** was a partner in the *Great Lakes Fisheries Leadership Curriculum and Institute* initiatives. This regional extension effort provided local leaders with an understanding of opportunities for increasing public understanding and participation in the management of Great Lakes and Lake Champlain fisheries. Two CD format publications from this project (Lake Champlain Fisheries Habitat and Aquatic Nuisance Species) have been published by LCSG. Sea Grant staff have

recently worked with the City of Plattsburgh and other stakeholders to address several issues associated with major bass fishing tournaments on Lake Champlain. Sea Grant provided (upon request) a review of potential bass tournament impacts, and steps that could be taken to mitigate negative impacts. Continued interest in bass tournaments on the lake suggests that research and extension opportunities will exist into the future.

**The Environmental Protection Agency** is involved in National Environmental Policy Act (NEPA) reviews to ensure minimum impact on the environment from construction, logging, highway, and other projects.

U.S. FISH AND WILDLIFE SERVICE



Missisquoi National Wildlife Refuge hosts one of the largest great blue heron nesting colonies in the Lake Champlain Basin.

# Protecting and Restoring Wetlands, Streams and Riparian Habitats

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

## KEY FEDERAL ACTIONS

### Natural Resources Conservation Service

The Wildlife Habitat Incentives Program (WHIP) provides financial and technical assistance to landowners to assist them in improving or enhancing wildlife habitat. From 2004 to 2006 NRCS obligated over \$1,297,000 of program funds for 163 projects on 9,050 acres in the Lake Champlain Basin. WHIP has

funded projects with the Nature Conservancy including restoration of clayplain forest on 85 acres, invasive plant control, and habitat management for a suite of Species of Greatest Conservation Need (SGCN), including the state endangered timber rattlesnake, eastern rat snake, and prairie warbler. WHIP has also partnered with VT DEC River Management in the lowering of a section of old railroad embankment in a floodplain of the Lamoille River. This project will reconnect the river with its floodplain which will restore the ecological functions, improve habitat and reduce the erosive force of the stream. A significant portion

of the WHIP funds have been used for early successional habitats to address habitat concerns identified in both state and regional plans. Finally, Vermont NRCS is beginning to address aquatic habitat improvement, which is a new national priority, with a few fish passage projects.

Since 1995 \$1,200,000 of Wetland Reserve Program (WRP) funds have been allotted to Vermont. A total of 17 wetland restoration projects were funded in the Basin, totaling 1,634 acres. This included funding for a Nature Conservancy restoration agreement on the Hubbardton River in West Haven, Vermont and the Pomainville Project, Vermont's largest WRP project (365 acres), which has been recently purchased by the State of Vermont.

In New York NRCS completed two stream stabilization projects in Clinton County on the Chazy River, including concrete block bank stabilization, bioengineering, and a riparian buffer, that provides a minimum of 35 ft of buffer. The farmer has also agreed to permanently seed the field to trap sediment and reduce further erosion.

NRCS in New York also provided technical assistance for a 9,950 ft long riparian buffer installed on cropland in Clinton County. The project provided \$5,579 in federal financial assistance to the farmer to install the buffer through the Environmental Quality Incentive Program (EQIP). The riparian buffer protects 161 acres of cropland adjacent to the Chazy River, and will filter runoff from the protected cropland. Six student volunteers assisted the NRCS with the plantings for the buffer.

BOB SYLVESTER/NRCS



A riparian forest buffer funded through the Natural Resources Conservation Service's CREP program.

On the New York side of the Basin, NRCS worked with landowners in the Wetland Reserve Program (WRP) to restore 76 acres of wetlands. NRCS provided both technical and financial assistance for the projects.

NRCS staff in New York provided technical assistance on a 20-acre CREP buffer installed on pasture land in Washington County. The 3,400 ft long riparian buffer included fencing to keep the cows out of Halfway Creek. The buffer protects 70 acres of cropland adjacent to Halfway Creek. Additional state grants provided funds for constructing watering facilities for the cows on pasture and a livestock crossing.

Technical and financial assistance was provided by NRCS in New York for a 95 acre Wildlife Habitat Improvement Project (WHIP) for ground nesting songbirds in the Halfway Creek watershed of Washington County.

## U.S. Fish and Wildlife Service

The 6,642-acre Missisquoi National Wildlife Refuge, located on the eastern shore of Lake Champlain near the Canadian border, provides habitat for a multitude of migratory birds and other wildlife. Throughout the Lake Champlain Basin, the Service's Partners for Fish and Wildlife Program annually completes 30–40 habitat restoration projects in cooperation with landowners and Federal and state agency partners. These projects restore and protect approximately 20 miles of riparian habitat, as much as a mile of in-stream habitat, and up to 500 acres of wetlands.

NRCS and the USFWS provide technical assistance to producers in the CREP, which has resulted in 154 acres of filter strips and riparian forest buffers. CREP provided funding for tree-planting services for buffers, and Conservation Districts have developed a plant materials sales program to address the demand.

## Environmental Protection Agency

The Agency is involved through the Five Star Restoration Program, which provides financial assistance on a competitive basis to support community-based wetland, riparian, and coastal habitat restoration, Section 104(b)(3) wetlands grants, and the Section 10 and Section 404 review process. With EPA funds,

the LCBP supported the Vermont Riparian Project designed to establish a native tree nursery for low-cost riparian plantings. EPA nonpoint source program funds (Section 319 funds) are also being used for riparian restoration in the Lake Champlain Basin.

## OTHER FEDERAL ACTIONS

Implementation of specific cost-shared projects by the **U.S. Army Corps of Engineers** under Section 542 of the Water Resources Development Act of 2000, such as wetlands creation/restoration and streambank protection/restoration will protect and enhance habitats. The Corps also regulates the discharges of dredged or fill material into waters, including many streams and wetlands. The EPA and the USFWS also provide reviews under this process.

The **U.S. Fish and Wildlife Service's National Wetland Inventory** program recently completed updates of wetland maps associated with 59 USGS topographic quad maps in the Basin.

The **National Oceanic and Atmospheric Administration**, through **Lake Champlain Sea Grant**, provides stormwater education that focuses on preventing and reducing non-point source pollution of Vermont watersheds and involves toxic substances, bacterial contaminants, phosphorous, organic materials and sediment pollution. NOAA Sea Grant is active in a number of programs that increase public awareness of stormwater issues, such as the Chittenden County Regional Storm Water Education Program, Smart Growth education, and northern Lake Champlain shore land erosion protection.

In 2005, the **National Fish and Wildlife Foundation** provided a \$10,000 grant to restore about 30 acres of riparian floodplain forest by planting native trees and protecting 3,200 ft of the Missisquoi River shoreline in Enosburg, Vermont, and provided \$75,000 in support of the Vermont Land Trust's project to protect a 405-acre parcel of land encompassing Preston Pond and a part of Resin Ridge in the Lake Champlain watershed. This project will protect important wildlife habitat, including peregrine falcon nesting habitat.

The **Natural Resources Conservation Service** assisted the Town of Williston with a plan that identifies erosion on Allen Brook and recommended stabilization measures. In Chazy, New York,

NRCS provided technical assistance on an 80-acre wetland restoration project. In Whitehall, an 18.8-acre riparian forest buffer was installed on a dairy farm along Mud Creek, and rock riprap and 800 ft of herbaceous stream buffer was installed along the Mettawee River.

The **Green Mountain National Forest** consists of more than 400,000 acres in central and southern Vermont. The Forest represents approximately seven percent of Vermont's land area and hosts up to 3.4 million visitors each year.

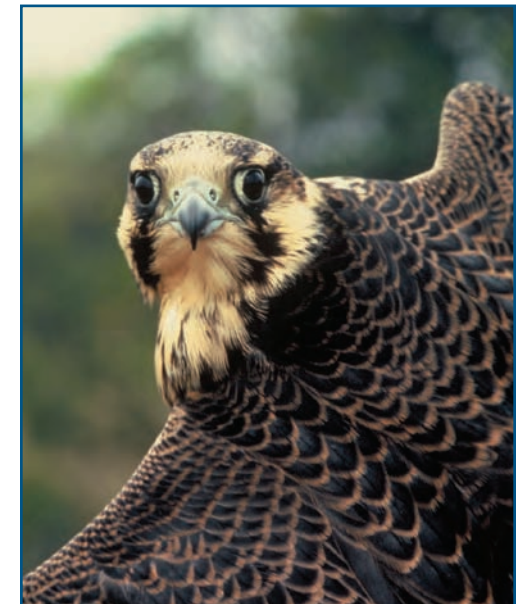
The Green Mountain National Forest is a leader in management and restoration of aquatic habitats within the Lake Champlain Basin, particularly headwater streams. Stream habitat restoration projects use geomorphic protocols and state-of-the art fisheries habitat management techniques in cooperation with local, state and other Federal partners including Vermont Department of Fish and Game and the USFWS.

The Green Mountain National Forest works in close cooperation with the State of Vermont in regard to responding to and controlling the spread of nonnative and invasive plant species within the Lake Champlain Basin.

Habitat management on the Green Mountain National Forest focuses on a wide variety of important wildlife species also found in the Champlain Valley. Habitat management on the Forest focuses on providing quality habitats for several threatened, endangered and sensitive species, and a diverse variety of locally important wildlife. Timber harvest and prescribed fire are just two of the tools used to maintain, improve, and restore wildlife habitats on the forest lands. Habitats that are routinely maintained include grassy openings, shrub lands, apple orchards, and unique forested communities such as aspen and birch stands and oak communities.

The Green Mountain National Forest is very active in partnerships to monitor not only the effects of its own activities, but also resources that are affected by off-forest activities in the region and across the country. Air and water quality is monitored to determine the effects of acid deposition.

U.S. FISH AND WILDLIFE SERVICE



National Fish and Wildlife Foundation funding will be used to protect peregrine falcon nesting habitat.

# Managing Nonnative Aquatic Nuisance Plants and Animals

*Control the introduction, spread and impacts of nonnative aquatic nuisance species in order to preserve the integrity of the Lake Champlain ecosystem.*

## KEY FEDERAL ACTIONS

### Environmental Protection Agency

EPA provides funding for the Lake Champlain Water Chestnut Management Program through the LCBP along with the U.S. Army Corps of Engineers, Vermont DEC, New York State Department of Environmental Conservation, USFWS, and local partners, like the Nature Conservancy.

EPA has also supported exploring non-chemical alternatives to sea lamprey control. Projects have included research on the development of a sea lamprey life history model, which will help quantify the levels of control needed on specific streams, and hydrologic modeling and site analysis for a sea lamprey barrier in Quebec.

As part of the Lake Champlain long-term monitoring program, EPA also provides funding for monitoring the zebra mussel population throughout Lake Champlain and several inland lakes in the Basin. Two small grants through the LCBP have been targeted towards controlling Eurasian watermilfoil, one in Vermont and one in New York. EPA is also involved in the NEPA review process, which provides an opportunity for screening Federal environmental projects that might contribute to the aquatic nuisance species problem. These reviews, conducted in EPA's regional offices, now include an explicit consideration of the proposed action with regard to invasive species. EPA also supports other invasive species control efforts both regionally and nationally.

### U.S. Fish and Wildlife Service

The Non-indigenous Aquatic Nuisance Prevention and Control Act authorizes Service expenditures for implementing Aquatic Nuisance Species (ANS) management plans. The last four years the Service has allocated from \$45,000 to \$100,000 annually to support an aquatic nuisance species coordinator and water chestnut control activities as part of the LCBP's implementation of the ANS plan. Cooperating with a variety of governmental agencies, non-governmental organizations, and landowners, the Service has also participated in purple loosestrife control using beetles (*Galerucella* spp.) that feed on infestations, and removing water chestnut from Lake Champlain wetlands. Missisquoi Refuge and lower Missisquoi Bay were also intensively surveyed for water chestnut annually.

### National Oceanic and Atmospheric Administration

LCSG is extensively involved in ANS programmatic efforts. Through its research initiatives, LCSG supports nuisance species research, including an innovative approach to water chestnut control, to better understand how the Lake's vari-

VERMONT DEC



Lake Champlain's water chestnut problem is addressed through the cooperation of Federal, state, and local partners.

ous sea lamprey nursery areas contribute juvenile lampreys to the adult population, and to contribute to regional efforts to manage cormorant populations and their impacts. Sea Grant research is also studying rainbow smelt population structure and dynamics. These fish are under threat from the newly introduced invasive alewife. Sea Grant extension efforts include the production and distribution of educational materials to boaters, anglers and the general public about practical approaches to prevent the spread of aquatic nuisance species. Extension/education efforts include the following reports: Lake Champlain Alewife Impacts—February 2006 Workshop Summary—2006 (published jointly with LCBP); Feasibility of Champlain Canal Aquatic Nuisance Species Barrier Options—2005; Zebra Mussels fact sheet—2003; Co-authorship of Adirondack Park Aquatic Nuisance Species Management Plan—2005. Sea Grant staff have recently provided presentations on ANS topics to the Adirondack Water Quality Conference, Trout Unlimited, NYS Canal Corporation, NY-CAC to LCBP, Rotary Club, American Fisheries Society, and the Lake Champlain Committee.

## **U.S. Army Corps of Engineers**

Implementation of specific cost-shared projects by the Army Corps of Engineers under Section 542 of the Water Resources Development Act (WRDA) of 2000 may include specific invasive species removal projects to help manage non-native nuisance plants while replanting native species, where appropriate, to help restore the affected area.

Aquatic Plant Control Program—Authorized by Section 104, River and Harbor Act of 1958, as amended. The Corps of Engineers, in cooperation with other Federal and non-Federal agencies, participates in a comprehensive program for the control of invasive aquatic plants, including water chestnut and Eurasian watermilfoil, which have adverse effects on navigation, flood control, drainage, agriculture, public health and fish and wildlife conservation. If appropriated, FY 2007 funds will be used to execute the annual agreement and continue the program with the State of Vermont on Lake Champlain.

Sea Lamprey Barriers Study—Authorized by Section 1135, WRDA 1986, as amended. The Corps completed, in cooperation with the USFWS, the LCBP, and the States of New York and Vermont, a Preliminary Restoration Plan in FY 2006 and found that a feasibility study is warranted to analyze potential restoration alternatives focused on sea lamprey barriers. When Federal funds are appropriated, a feasibility study will be initiated.

# Managing Recreation Resources

*Manage Lake Champlain, its shorelines and its tributaries for a diversity of recreational uses, while protecting its natural and cultural resources.*

## KEY FEDERAL ACTIONS

### National Park Service

Through multi-year technical assistance programs and various grants, the National Park Service (NPS) has supported planning and implementing of recreational projects such as an American Disability Act (ADA) approved trail at Mount Independence, the Paddlers' Trail, and the Lake Champlain Bikeways trail system, which includes signage and thematic loops. The NPS serves on the Cultural Heritage and Recreation Advisory Committee, providing program assistance and coordination.

### U.S. Fish and Wildlife Service

With facilities at Pittsford National Fish Hatchery and staff outreach from the other programs in the Lake Champlain Basin, the Service is supporting a major recreational fishery in the Lake Champlain Basin, which generates over \$200 million dollars annually. The Missisquoi National Wildlife Refuge annually provides environmental education and recreation opportunities to thousands of visitors. Uses include waterfowl, upland game and big game hunting; fishing, trapping, wildlife observation, photography, canoeing and kayaking; and the use of walking trails through lake-side habitats. Guided walks and boat rides address the refuge's protection and management missions, as well as natural and cultural history.

### U.S. Geological Survey

The USGS operates a network of 49 streamflow, lake, and reservoir gaging stations in the Lake Champlain Basin that transmit near real-time data via satellite to its computer web site. Data are

updated at intervals of four hours or less. This information supports enhanced recreational use of the Lake and tributary streams and reservoirs by providing data to boaters, canoeists, kayakers, fishermen and others to plan safe outings and match the conditions of the water to their own abilities or skill levels.

### Environmental Protection Agency

EPA funds allowed the LCBP to help facilitate the creation of a reciprocal fishing license agreement between Vermont and New York, which allows anglers from either state to fish on both sides of most of Lake Champlain without buying an additional license. Other LCBP grants supported the development of a bilingual boating publication, information about non-motorized tourism in the region, and expansion of the underwater park system.

## OTHER FEDERAL ACTIONS

The **National Oceanic and Atmospheric Administration** (Sea Grant), through its aquatic resources and coastal communities programs including Clean Marina, Clean Boating and recreational fisheries extension activities, supports the sustainable management of the coastal and aquatic recreational resources. Sea Grant Fisheries Leadership activities strengthened local angler understanding of fisheries management and how they could more effectively participate in the management of this economically important resource. LCSG developed a module on voluntary marina best management practices that are an integral component of the Cornell Extension LEAPE Training program for local officials in New York.

GARY RANDORF



Cyclists cruise along the Champlain Bikeway in Essex County, New York.

# Protecting Cultural Heritage Resources

*Identify, preserve, enhance and protect the irreplaceable cultural heritage resources of the Champlain Basin for the public benefit, now and for generations to come, and promote an appreciation of their value as a vital aspect of the Basin's economic and community life.*

## KEY FEDERAL ACTIONS

### Environmental Protection Agency

The EPA, through the LCBP, has funded an underwater survey of Lake Champlain since 1996 by the Lake Champlain Maritime Museum. More than 300 square miles of lake bottom have been surveyed, and more than 75 new shipwrecks have been located and documented. These new cultural resources and the many previously-known shipwrecks give Lake Champlain the most extraordinary archaeological collection of historic wooden ships in North America. The survey has also raised public awareness about the significant history of Lake Champlain and the threat that zebra mussels hold for these irreplaceable resources.

LCBP



This wayside exhibit, located in Burlington, interprets the cultural and natural history of the Basin.

ously-known shipwrecks give Lake Champlain the most extraordinary archaeological collection of historic wooden ships in North America. The survey has also raised public awareness about the significant history of Lake Champlain and the threat that zebra mussels hold for these irreplaceable resources.

### U.S. Coast Guard

To cap off the \$6 million Corps of Engineers rehabilitation of the 19th century breakwater, Senator Leahy obtained a \$250,000 Coast Guard appropriation to install historically accurate light towers with state-of-the-art lighting technology in the harbor. The light towers help tell the story of Burlington's commercial

maritime heritage, and provide another attraction for residents and visitors to the waterfront.

### National Park Service

The Service facilitated an inventory of cultural resources in the Basin, which culminated in the *Champlain Valley Heritage Corridor* report. The Service also provided LCBP funding and assistance for Historic Landings signage, underwater mapping, survey and preserves development, the Unknown Treasures project, and supported the Cultural Heritage and Recreation Coordinator position. The NPS serves on the Cultural Heritage and Recreation Advisory Committee, providing program assistance and coordination.

NPS and EPA funds have supported the LCBP's Wayside Exhibit. The LCBP has provided design services for 125 wayside exhibits for communities and organizations in New York, Vermont, and Quebec, using the template developed for signage in the Champlain Valley. Wayside exhibits are excellent tools for interpreting the environmental, cultural, natural and/or historical significance of a site. This interpretation leads to better public understanding and stewardship of the Basin's resources.

The passage of the Champlain Valley National Heritage Partnership Act by the U.S. Government in October 2006 could strengthen the role of the NPS in the Basin region. This legislation establishes the Champlain Valley National Heritage Partnership with the States of Vermont and New York. This partnership will help preserve, protect, and interpret the historical, cultural, and

recreational resources of the Champlain Valley. The Partnership Act authorizes the Secretary of the Interior to provide technical and, if funds are appropriated, financial assistance to the management entity (the LCBP) to carry out the purposes of the act.

### **Natural Resources Conservation Service**

The NRCS conducts cultural resources reviews of all land disturbing practices during planning assistance to comply with the National Historic Preservation Act. Six hundred earth moving conservation practices planned in the Vermont portion of the Champlain Basin were reviewed from 2004 through 2006 to determine if installation of these projects would adversely affect significant cultural resources. Three hundred and eighteen site visits were conducted that included a systematic surface survey, subsurface testing or a combination of methodologies used to locate archeological resources within and adjacent to the project limits.

In Vermont sixty three archeological sites were encountered during the planning process from 2004–2006. A majority of these sites are Native American short-term encampments or special use sites from the pre-contact cultural period and the others are from the historic period, such as abandoned farmsteads and small industrial sites. None of the 600 conservation practices planned by NRCS during this period disturbed any of the cultural resources encountered. Nine projects were redesigned and moved to avoid disturbing the nearby archeological site. One homestead found on the Lake shore is attributed to the French occupation of Lake Champlain circa 1730–1758; however, most of the historic sites are from the 19th century. One of these historic sites is a lime kiln, another is a saw-mill, and several others are the ruins of farmsteads or residential sites.

In 2004, the Vermont NRCS, in cooperation with the St. Francis/Sokoki band of the Abenaki Nation, the towns of Swanton and Highgate and the Vermont Land Trust, conducted ground penetrating radar studies on privately owned properties near the Missisquoi River to search for unmarked Abenaki graves in advance of house development. Although no unmarked burials were identified, two Abenaki encampments were discovered that dated anywhere from 500–3,000 years ago.

Thirty cultural resource investigations have been completed by NRCS in New York in the Lake Champlain Basin over the last three years.

### **Department of Defense**

The Lake Champlain Maritime Museum (LCMM) received support from the Department of Defense (DOD) Legacy Resource Management Program in 1995, 1998, and 2000–2003. Working through the Naval Historical Center, LCMM manages the Federally owned properties on the lake bottom, such as military related shipwrecks and artifacts. The centerpiece of LCMM's research is Benedict Arnold's Gunboat *Spitfire*, lost on October 12, 1776, during the American retreat from the Battle of Valcour Island. On behalf of the Navy, LCMM monitors the site to ensure that ill-intentioned divers do not damage it, conducts a yearly inspection of the vessel, and is completing a management plan for the boat. DOD Legacy funding also supports the Valcour Bay Research Project. This is an underwater archaeological survey, undertaken since 1999, to study Revolutionary War battlefield scatter and preserve sites from artifact collectors by fostering site stewardship with local recreational divers.

## OTHER FEDERAL ACTIONS

The **U.S. Fish and Wildlife Service** cooperates with local Native Americans, Universities, and state and Federal cultural resource agencies to protect and interpret archaeological resources at Missisquoi National Wildlife Refuge, which is culturally one of the most significant sites in Vermont.

In 2001 and 2003, the LCMM received funding from the American Battlefield Protection Program (ABPP) of the **National Park Service** in support of the Valcour Bay Research Project. In the 2003 grant, the ABPP has also asked LCMM to inventory the privately held collections of artifacts taken from Valcour Bay over the past several decades.

The **Environmental Protection Agency**, through the LCBP, funded the design and printing of the *Vermont Cultural Heritage Tourism Toolkit* in 2003. The Toolkit furnishes parties interested in cultural heritage tourism with the information they need to develop cultural heritage tourism “products” that are authentic, engaging, and sustainable.



Artist Ernie Haas' depiction of the gunboat *Spitfire* on the bottom of Lake Champlain.

## Informing and Involving the Public

*Promote a better understanding and appreciation of the Lake Champlain Basin and its resources in order to encourage greater public participation, individual responsibility and action for protecting these resources.*

### KEY FEDERAL ACTIONS

#### Environmental Protection Agency

The LCBP, through EPA funding, taught students from more than 76 classrooms in New York and Vermont about Lake Champlain during 2006. A State of the Lake report was released in 2005 and is currently available on the LCBP website. The LCBP also released Progress 2006 in October which highlighted progress to date since the Lake Champlain Special Designation Act written by Congress became law in 1990.

The LCBP continued its partnership with WPTZ NewsChannel 5 on the *Champlain 2000* weekly television series, which was re-launched under a new name, *Champlain Connection*, in October 2004. Five new exhibits about Lake Champlain were installed at the Champlain Centres North Mall in Plattsburgh, New York, to increase citizen awareness about Lake Champlain issues. The LCBP also awarded eight Education and Outreach grants totaling \$31,500 to New York and Vermont organizations in 2006.

The LCBP continues to operate and staff a Resource Room within ECHO at the Leahy Center for Lake Champlain that provides in-depth information on lake issues, research, stewardship, and educational curricula for the public. Since ECHO opened in May 2003, more than 72,000 visitors have been assisted by Resource Room staff. Twelve updateable exhibits for the ECHO floor highlighting local watershed stewardship projects were created by the LCBP during 2006.

#### Environmental Protection Agency, U.S. Department of Housing and Urban Development, and the Institute for Museum and Library Services

Federal funding was a major part of the total package that allowed the development of ECHO at the Leahy Center for Lake Champlain, as well as the Rubenstein Ecosystem Science Laboratory. ECHO is Lake Champlain's premier lake aquarium and science center, which educates and delights guests of all ages about the ecology, culture, history, and opportunity for stewardship of the Lake Champlain Basin.

Encompassing almost 30,000 square feet, ECHO features twenty aquatic habitats with more than 60 animal species, and 100 hands-on interactive exhibits. Visitors go nose-to-nose with live fish, amphibians, and reptiles and experience a multimedia theater, all surrounded by beautiful views of Lake Champlain and the Adirondack Mountains.

ECHO/NICK LAVECCHIA



ECHO at the Leahy Center for Lake Champlain opened in May 2003. About 150,000 guests visit ECHO annually.

## U.S. Fish and Wildlife Service

On October 14, 2005, the Service held a grand opening ceremony to celebrate the construction of a new headquarters and visitor facility at the Missisquoi National Wildlife Refuge. The new 7,250 square-foot facility will include a lobby and reception area, exhibit area, and multi-purpose room for environmental education, public meetings or presentations, and community events. With additional facilities at Pittsford National Fish Hatchery and staff outreach from the other Service programs in the Lake Champlain Basin, the Service is supporting enhanced understanding of the Basin's resource management problems to allow informed choices on its long-term protection and restoration.

## National Oceanic and Atmospheric Administration

The LCSG provides science-based information to the public, resource users and stakeholders, and decision makers to increase their awareness of key coastal and aquatic resource issues and to help them make informed choices among difficult resource management decisions. Sea Grant informs the public about water quality, watershed stewardship, nuisance aquatic species, fisheries and other Basin issues through contributed articles to local newspapers, radio and TV interviews, and videos on public access television. Sea Grant sponsors *Across the Fence* television productions that inform the public about community led actions in water quality and watershed protection.

## Natural Resources Conservation Service

Adirondack Waterfest 2003 attracted about 500 people to the shores of Lake Champlain at Plattsburgh Landing in New York. This annual educational event educates the public about the importance of water resources. The effort was coordinated by the Greater Adirondack RC&D Council, the Clinton County Soil & Water Conservation District, the NRCS (New York), and local groups. The Waterfest features educational exhibits, entertainment, children's activities, and water-related demonstrations.

## National Park Service

NPS provided multi-year support of a bikeways clearing-house designed to coordinate and disseminate information about bike trails, supported public access information media, and facilitated a public information series. Through their work on the Cultural Resources and Recreation Advisory Committee, the NPS assists LCBP staff in disseminating information about trails, programs and events to a broad constituent base.

## U.S. Geological Survey

In 2004, the USGS relocated its Lake Champlain gaging station in Burlington, which has operated continuously since 1907, to ECHO at the Leahy Center for Lake Champlain. The gaging station is located on the Center's dock and includes instrumentation and a display available to the public. The USGS has entered into an educational partnership to support the Center's Watershed Weather Studio that informs the public about the meteorology and hydrology of the watershed and how these sciences relate to a wide variety of activities at the Federal, State, and local levels to improve the health of the Lake, protect and manage watershed resources, and support the regional economy.

## OTHER FEDERAL ACTIVITIES

The Town of Ticonderoga replaced a deteriorating concrete slab that was used as a fishing platform for many years along the La Chute River with support from the Greater Adirondack RC&D Council, Essex County Soil & Water Conservation District, the **Natural Resources Conservation Service** (New York), and the New York State Soil & Water Conservation Committee.

## Building Local-Level Implementation

*Support and enhance cooperative watershed planning efforts to protect and improve water quality.*

### KEY FEDERAL ACTIONS

#### Environmental Protection Agency

Local grants are a key component of the LCBP funding from the EPA. Nearly \$3 million has been granted since 1993 for local projects by towns and not-for-profits. In 2005, \$178,962 was allocated. Projects include providing organizational support for local watershed groups, cleaning up streams, increasing Lake access, helping homeowners prevent pollution, and revitalizing cultural sites.

#### National Oceanic and Atmospheric Administration

Education and engaging students, youth groups and underserved youth in watershed stewardship are major activities of LCSG through the Watershed Alliance and the Northern New England Lake Education and Action Project. With EPA support, Sea Grant, the UVM Watershed Alliance and Edmunds Middle School have developed an urban watersheds and water-quality education program that complements and strengthens the existing science curriculum. The curriculum is now in use in six 7–8 grade science classes at area middle schools. LCSG is also active in improving local government and community organizations' capacities for watershed and water-quality protection by developing tools and providing educational and technical assistance. LCSG works in partnership with municipal officials, businesses, educators, and volunteer groups to engage the public in protecting lake and stream water quality from domestic/urban non-point source pollution in stormwater, increase public participation in basin planning, watershed and lake stewardship and stream restoration, and reduce and control erosion. LCSG now supports a full time Water Quality Educator to develop and deliver a Vermont/Lake Champlain

NEMO program, part of a national effort to assist communities in identifying and reducing non-point source pollution from urban sources.

### OTHER FEDERAL ACTIONS

In 2004, the **Lake Champlain Basin Program** and the Citizens Advisory Committees held two public meetings in New York and Vermont that were attended by 200 citizens. These meetings provided important public input on Lake Champlain issues, and the plan, *Opportunities for Action*.

Section 542 of the Water Resources Development Act of 2000 allows the **Army Corps of Engineers** to assist with planning, designing and implementing local projects.

Through its Partners for Fish and Wildlife program, the **U.S. Fish and Wildlife Service** is a key funding partner in many watershed planning efforts in the Lake Champlain Basin.

The **Natural Resources Conservation Service** works with and through Conservation Districts and local work groups, as well as partners, to implement conservation activities. The eleven Vermont and four New York NRCS offices in the Basin provide a local-oriented conservation delivery system.

The **National Park Service** provides various grants through the LCBP, including the Technical Assistance Program, Partnership Program, and Public Access Enhancement Awards.

LAKE CHAMPLAIN SEA GRANT/MARK MALCHOFF



Students learned how to identify stream macro-invertebrates (insects) through Lake Champlain Sea Grant's Watershed Alliance program.

# Measuring and Monitoring Success

*Document progress and achievements resulting from implementation of the Plan.*

## KEY FEDERAL ACTIONS

### Environmental Protection Agency

For more than 15 years now, EPA funds, through the LCBP, have supported the Lake Champlain Long-term Biological and Water-Quality Monitoring conducted jointly by the States of Vermont and New York. This long-term database has been critical to tracking progress in *Opportunities for Action* and will help track implementation of the TMDL. The Lay Monitoring Program, the second oldest citizen-monitoring program in the United States is nearly 25 years old and is conducted by the Vermont DEC. This citizen-collected data also have been vital to tracking *Opportunities for Action* both within Lake Champlain and inland lakes in its Basin.

Blue-green algae monitoring, described fully in the Human Health section, is coordinated with both of these long-term monitoring efforts via the LCBP.

### National Oceanic and Atmospheric Administration & U.S. Department of Agriculture

With support from a USDA Water-Quality grant, Sea Grant and the UVM Watershed Alliance recently developed a web-accessible water quality database, called the Vermont Water-Quality Gateway. The Gateway will allow the public to view and download data, while a password-protected data-entry portal will allow data entry by

participating educational and approved citizen monitoring groups. The Watershed Alliance is active in 15 schools in Vermont and New York. Alliance schools collect quality-controlled stream and water-quality data. These data provide important baseline conditions and allow for the tracking of any improvements or deterioration in water quality.

### U.S. Fish and Wildlife Service

The Service's ongoing fisheries technical assistance program includes a variety of monitoring efforts for salmonids, forage fish and other species. In addition, migratory bird population monitoring at Missisquoi National Wildlife Refuge tracks occurrence of a variety of waterfowl and other species at the Refuge.

### Natural Resources Conservation Service

NRCS maintains a "Performance Results Measurement System" to track specific conservation accomplishments. NRCS also has collaborated with the Agency of Agriculture in tracking phosphorus reductions associated with joint cost-share efforts.

### U.S. Geological Survey

The U.S. Geological Survey has worked with the State of Vermont to determine if phosphorus levels in tributaries to Lake Champlain are decreasing, remaining the same or increasing since the early 1990s. These analyses are included in the 2005 State of Lake Report, which describes conditions in the Lake and progress towards meeting phosphorus reduction goals. Phosphorus levels were found to be statistically declining in six tributaries, remaining the same in eight, and increasing in three tributaries.

VERMONT DEC



A volunteer lay monitor uses a secchi disk to measure the water clarity of Lake Champlain.

## OTHER FEDERAL ACTIONS

Data from the U.S. Geological Survey's network of 49 streamflow, lake, and reservoir gages in the basin provide valuable support to a wide variety of monitoring efforts. USGS's long-term (1999–2008) study of the efficacy of urban BMPs in reducing phosphorus and sediment loads to Lake Champlain is described in the section on reducing phosphorous pollution.

Extension, education and research programs supported by **Lake Champlain Sea Grant** include monitoring and reporting components. Outputs, outcomes and impacts are reported annually and are available to agencies, organizations and the public.

EPA/ERIK H. BECK



USGS Englesby Brook Gaging Station.

## Economics in the Lake Champlain Basin

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*Promote healthy and diverse economic activity and sustainable development principles within the Lake Champlain Basin while improving water quality and conserving natural and cultural heritage resources on which the regional economy is based.*

### THE IMPACT OF FEDERAL ACTIONS

The economic impact of Federal agency actions in the Lake Champlain Basin occurs in two ways. In addition to the direct economic impact of Federal expenditures, the regional economy benefits from improvements in information, infrastructure and the environment as a result of Federal actions.

The total indirect economic impact of Federal activity in the Basin, while difficult to measure, clearly is substantial. For example, sea lamprey control is an integral component of the USFWS's commitment toward restoring landlocked Atlantic salmon and other native species to the Lake Champlain Basin. The control program also receives significant support through the Department of State-funded Great Lakes Fishery Commission, LCSG, LCBP and the States of New York and Vermont. Overall, the Lake Champlain sea lamprey control program contributes over \$4 million directly to the regional economy, but is key to protecting a recreational fishery that, as estimated in 1997, contributes over \$200 million annually.

Even the direct impact of Federal expenditures in the Basin is difficult to measure for several reasons. For example, no Federal agency routinely identifies its expenditures within a watershed boundary. Even if such data were readily available, expenditures to support headquarters or other outside staff that work all or part of the time on issues within the watershed aren't usually quantified on a watershed basis. Neither are Federal technical and office equipment and vehicles, which are generally used partly to support work within a watershed.

Nevertheless, the direct significance of Federal expenditures in the Lake Champlain Basin is apparent from the following statistic: 92% (83 of 90) of the actions listed in *Opportunities for Action* identify Federal appropriations among the potential funding sources.

**Federal appropriations  
are identified for 92%  
of the actions listed in  
*Opportunities for Action*.**

EPA/ERIK H. BECK



Burlington Marina.