



VERMONT

Introduction and General Description

The fish and wildlife resources in the Lake Champlain basin of Vermont and New York and eastern Vermont's Connecticut River drainage occupy a mosaic of interconnected aquatic and terrestrial habitats. The natural communities that support these habitats have been negatively impacted for the past 200 years with various types of land and resource management. Since 1992 the U.S. Fish and Wildlife Service's Partners for Fish and Wildlife Program (Partners) in cooperation with other federal, state, and NGO programs has played a key role by helping private landowners restore, improve and protect important fish and wildlife habitats. The Partners Program continues to provide financial and technical assistance to private landowners through voluntary habitat management agreements.



Wood ducks

Projects are focused in geographic areas and on habitats which will provide the greatest benefit to Federal trust resources which include: migratory birds, interjurisdictional fish, and federally listed threatened and endangered species. Restoration of wetlands, woodlands, and riparian areas throughout the region provide breeding habitat and critical migratory stopovers for migratory birds. Restoration of in-stream habitat is beneficial to fish populations, including landlocked and sea-run Atlantic salmon a focal species for the U.S. Fish and Wildlife Service and its cooperators in the Lake Champlain Basin and the Connecticut River watershed.

Projects have included restoring wetland hydrology, planting native trees and shrubs, riparian restoration through livestock exclusion, control of exotic plants, fish passage, and restoration of in-stream aquatic habitat.



Silver Maple – Ostrich Fern Floodplain Forest

Vermont Activities

- ★ *Riparian/Floodplain Restoration*
- ★ *In-stream Fisheries Restoration*
- ★ *Wetland Restoration*
- ★ *Invasive Species Control*
- ★ *Fish Passage(culvert and dam removal)*

Habitats of Special Concern

The Lake Champlain Basin and the Connecticut River Valley include some of the highest quality wetland habitats in the northeastern United States. In addition, the streams and riparian habitats in this region provide key habitat for a number of Federal trust species and a significant number of rare plant and animal species. Ten bird species in the Lake Champlain Basin are listed by New York, Vermont and/or the Federal government as endangered or threatened, including bald eagle and black tern. One mammal species, the Indiana bat, is federally

listed as endangered. Seven fish species found in the Lake Champlain Basin are classified by Vermont or New York as endangered or threatened, including lake sturgeon, American brook lamprey and Eastern sand darter. The highest native freshwater mussel diversity in New England occurs in the Lake Champlain watershed with nine of the species being state-listed. Populations of the dwarf wedge mussel, a federally-listed endangered species, occur in the Connecticut River.



Atlantic salmon

Threats

The effects of two centuries of European settlement have had severe adverse consequences on local ecosystems. The Vermont Agency of Natural Resources (ANR) has estimated that over 35% of Vermont's wetlands have been lost and that 1200 river miles do not fully support designated uses or are not in compliance with water quality standards.

Agricultural, transportation and residential development continue to adversely affect Federal trust fish and wildlife resources dependent on good water quality and available aquatic habitat. Phosphorus

loading is a serious problem in the Lake Champlain Basin and has increased four-fold over the original pre-development levels. Current threats include excessive bank erosion and siltation, loss of riparian plant communities, incremental loss of wetlands, excessive nutrient inputs, high summer water temperatures, and low oxygen conditions in some river systems.

Relatively recent introductions of invasive plants, e.g. purple loosestrife, water chestnut, have caused significant impairment to wetlands and other natural communities.

Based on historical records, Atlantic salmon, walleye, and lake sturgeon were once caught in abundance in Lake Champlain and sea-run Atlantic salmon were common in the Connecticut River system. Eastern brook trout were once found throughout all of the watersheds in Vermont. Dams and transportation infrastructure have caused habitat fragmentation which adversely affects all of the above fish populations.

Conservation Strategies

Partnerships to benefit Federal trust resources are a primary emphasis of the Partners Program. Combining the goals of private landowners and other conservation partners with those of the Service has allowed the Partners Program

to leverage the value of Service funds at better than a 3:1 ratio.



Volunteer planting day

Riparian Habitat -

Agricultural land clearing and loss of floodplain forests have had a detrimental impact on water quality and degrade habitat for wildlife that are dependant on these areas for breeding and as dispersal corridors. The Partners Program restores riparian habitat (\$2-\$4 per linear ft) in partnership with other Federal and State agencies, municipalities, and non-governmental organizations by fencing out livestock and stabilizing streambank habitat using bioengineering techniques and native plantings.



Silver maple riparian buffer plantings

Wetlands – The Partners Program restores degraded wetlands by blocking old drainage ditches with low-level berms and restoring original wetland micro-topography lost due to past agricultural drainage and land-leveling practices. Completed projects often result in a mosaic of permanent and seasonal wetlands with a variety of vegetation types providing habitat for numerous wetland dependent species. Wetlands are restored at a cost of \$700-\$1000 per acre.



Restored wetland



Same wetland aerial view

In-stream Habitat - The Partners Program works comprehensively on in-stream fisheries restoration projects using multiple techniques which include lowering incised floodplains, the installation of large woody material for in-stream cover and bank stability and the restoration of proper pool/riffle ratios using a geomorphic approach to river

channel restoration. These techniques are used to reduce the amount of fine sediment that enters the river which degrades in-stream habitat. River restoration projects are combined with riparian revegetation practices to secure multiple benefits to fish and wildlife. River channel and fisheries habitat restoration projects have been completed at a cost of \$20-\$30 per foot.

Invasive Species - Wetland and upland habitats of the Lake Champlain and Connecticut River valleys have been adversely affected by the introduction of several invasive species. Purple loosestrife and water chestnut invade wetland areas and out compete native plants often resulting in monotypic stands with adverse consequences to native fish and wildlife.

Working with the VT Dept. of Environmental Conservation, the Partners Program has assisted with the propagation and release of insects that feed exclusively on purple loosestrife which has resulted in significant reductions of loosestrife abundance in targeted wetlands. In partnership with TNC, the Partners Program has assisted with efforts to remove water chestnut infestations from the Lake Champlain wetlands of New York and Vermont. This involves the arduous task of hand-pulling the plants before they set seed. With assistance of many dedicated volunteers, water chestnut has been significantly reduced in

many areas. Costs for invasive species control projects range from \$250-\$700 per acre.

Fish Passage –The fragmentation of stream habitat by dams and transportation infrastructure has become a major concern for the aquatic resources of Vermont. Working in partnership with the interagency Vermont Dam Task Force, the VTANR, and local conservation groups, the Partners Program is assessing and evaluating numerous barriers to fish passage in the White River Watershed and the Lake Champlain Watershed. Barrier removal combined with in-stream habitat restoration will restore access to historical spawning areas and allow for needed seasonal migration of fish to upstream and downstream areas. Several projects are in the design and fund-raising stage. Expected costs for each of these projects range from \$20,000 to \$250,000.



In-stream concrete barrier



Barrier after weir construction

Accomplishments

Since first receiving operational habitat restoration funding in 1991, the Partners Program has completed:

- ★ *Over 450 projects with about 500 different landowners*
- ★ *215 miles of riparian restoration*
- ★ *2400 acres of wetland restoration*
- ★ *9.1 miles of in-stream restoration*
- ★ *635 acres of upland restoration*
- ★ *1430 miles of stream reopened to fish passage*
- ★ *1200 acres of habitats impacted by invasive species*

Future Needs

- Restore and protect 1000 in-stream river miles using techniques that address bank erosion and provide the necessary pools and riffles to restore native fisheries habitat and increase the recreational value of rivers to local communities.

- Open 500 miles of aquatic habitat through the removal of barriers to fish passage.
- Restore and protect 5,000 miles of riparian habitats to provide critical areas for migrating songbirds and buffer areas necessary for healthy river systems.
- Assist interagency efforts reduce annual phosphorus loads to Lake Champlain by 57 metric tons using stream and riparian restoration projects.
- Restore or enhance 1000 acres of wetlands, primarily in the Lake Champlain watershed, to provide benefits to migratory waterfowl and other wetland birds. Recent data indicates more than 84,000 acres of potential wetland restoration.

Partners

Natural Resources Conservation Service
Farm Services Agency
Vermont Association of Conservation Districts
All 14 Natural Resources Conservation Districts

Green Mountain National Forest
State of Vermont Departments of Fish and Wildlife, Environmental Conservation, Transportation, and Agriculture
New York Department of Environmental Conservation
Environmental Protection Agency
Lake Champlain Basin Program
Connecticut River Joint Commission
The Nature Conservancy
Trout Unlimited
Ducks Unlimited
FishAmerica Foundation
Vermont Land Trust
Vermont Youth Conservation Corps
Missisquoi River Basin Association
White River Partnership
Lewis Creek Association
Battenkill Watershed Alliance
Friends of the Mad River
Poultney-Mettowee Watershed Partnership
Friends of the Winooski River
Lamoille River Anglers Association
Green Mountain Fly Tiers
Orvis Company Inc.
Private landowners
Numerous Municipalities

Contact

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