

Ducks Unlimited, Inc. - Vermont In-lieu Fee Program

(updated 12/07/10)

Table of Contents	Page
Ducks Unlimited, Inc. Contact Information	3
Introduction and Statement of Need	4
Goals and Objectives	5
Qualifications of Sponsor	6
Establishment and Operations	7
VT In-lieu Fee Program Description	8
Service area	8
Accounting procedures	10
Provision of legal responsibility	10
Default and closure provisions	10
Reports and reporting protocols	12
Compensation Planning Framework Summary	14
Credit structures	15
Advanced Credits	15
Project-specific credit and fee schedules	17
In-lieu fee program account	17
Credit accounting	18
Long term Management and financial arrangements	19
Signature Page	20
Appendices	
I DU Organizational Structure	21
II Sample Credit Sale Letter	23
III Sample Annual Report Ledgers	24
IV Compensation Planning Framework	26
V 2010 Credit Fee Schedule	77

Ducks Unlimited, Inc. Administrative Contact

Chris Theriot
Manager of Conservation Programs
Ducks Unlimited, Inc.; Great Lakes/Atlantic Regional Office
1220 Eisenhower Place
Ann Arbor MI 48108
734.623.2000
ctheriot@ducks.org

Ducks Unlimited, Inc. Biological Contact

Sarah Fleming
Regional Biologist/Mitigation Specialist
1220 Eisenhower Place
Ann Arbor MI 48108
734.623.2000
sfleming@ducks.org

Ducks Unlimited, Inc. Local Contacts

Ray Whitemore
Director of Conservation Programs – New England
122 Joe English Rd
New Boston, NH 03070
603.487.2175
rwhitemore@ducks.org

and

April Moulaert, PWS
Waterscapes LLC –Contract Biologist with DU
36 Westminster Drive
Burlington, Vermont 05408

Introduction and Statement of Need

This instrument addresses compensatory mitigation for impacts to the waters of the United States and state waters including wetlands, streams and associated buffers, in the State of Vermont. The instrument establishes the Ducks Unlimited, Inc.-Vermont In-Lieu Fee Program (DU-VT ILF Program) and establishes guidelines, responsibilities, and standards for the establishment, use, operation, and maintenance of the DU-VT ILF Program.

The DU-VT ILF Program will be used for compensatory mitigation for unavoidable impacts to waters of the United States in the State of Vermont. Permits are required by the U.S. Army Corps of Engineers (“Corps”) through the Clean Water Act (“CWA”) Section 404 for discharge of dredge or fill materials within “waters of the U.S.”; through the Rivers and Harbors Act Section 10 for structures or work in or affecting navigable water of the U.S.; and by the Vermont Department of Environmental Conservation (“DEC”) under section 8.5 of the Vermont Wetland Rules. These regulatory agencies require that aquatic resource functions and services lost due to impacts be replaced through compensatory mitigation after addressing avoidance and minimization of impacts. The following instrument outlines the circumstances and manner in which a statewide in lieu fee program (ILF Program) will provide a compensatory mitigation option to permit applicants under the Corps and DEC permit programs, including as a potential option for compensation for secondary impacts; for possible use by the Corps for Civil Works projects; and as an option for resolution of enforcement cases.

The DU-VT ILF Program will not serve as non-federal match for federal grants or other federal programs requiring a cost-share from a non-federal entity. However, this does not preclude use of the program funds for projects associated with projects funded by such agency grants. For example, the federal grant might pay for a fish ladder and the ILF funds might pay for preservation and wetland restoration in the area around the ladder.

In Vermont, most permittee-responsible compensatory wetland mitigation projects implemented are small, less than one acre in size, and their environmental benefits are thus limited in scope. Numerous studies have shown that many mitigation sites in New England and throughout the U.S. have a high rate of failure. They fail to meet performance standards and have significant information gaps regarding compensation goals, planning considerations, design features and monitoring data (Wilkinson and Thomas 2005; Minkin and Ladd 2003; NRC 2001; Kusler and Kentula 1990). Mitigation failure rates are linked to several specific issues that can be addressed by developing a mitigation program that incorporates landscape and watershed planning, well-defined project goals and success criteria, baseline data, proven site selection criteria and restoration techniques, and effective monitoring and management plans, all of which are addressed in the DU-VT ILF Program sponsored by Ducks Unlimited, Inc.

Federal regulations recognize that ILF Programs are an environmentally preferable option over permittee-responsible mitigation based on several factors. ILF Program projects target larger, more ecologically valuable parcels that have been prioritized on a landscape or watershed scale. ILF Programs consistently include thorough scientific analysis, planning, implementation and monitoring for each project. The structure of an ILF Program facilitates up-front site selection, mitigation plan development, and provides for better scientific expertise and financial assurances which translates to reduction of temporal loss of aquatic resource function and project success uncertainty (33 CFR Part 332).

The Corps will generally require compensatory mitigation for projects requiring written authorization from the Corps but there will be some circumstances when it will not be appropriate. Although use of third party mitigation would not be required in every case, permittee-responsible mitigation would need to be shown to be ecologically meaningful and have long-term sustainability.

Goals and Objectives of the DU-VT ILF Program

The goals and objectives for the DU-VT ILF Program are as follows:

- Provide an alternative to permittee-responsible compensatory mitigation that will effectively replace functions and services lost through permitted impacts.
- Provide a compensatory mitigation option for Corps Civil Works projects, and function as an option for resolution of enforcement cases.
- Minimize the temporal loss of wetland functions and services by gaining approval of mitigation sites in advance of mitigation needs as funds allow.
- Create a program that has a level of accountability commensurate with mitigation banks as specified in 33 CFR Part 332.
- Provide projects to meet current and expected demand for credits.
- Achieve ecological success on a watershed basis by providing wetland types and functions that are appropriate, (e.g., identification of vulnerable wetlands in the watershed, stressors, ecological restoration opportunities, and priority conservation areas) to the service area and by integrating ILF Program projects with other conservation goals and objectives, whenever possible.

Qualifications of Sponsor

Ducks Unlimited (DU) is recognized as the world's largest private wetlands conservation organization and has over 70 years of experience restoring and protecting habitat, especially aquatic resources. Over the past 20 years, DU has worked with partners in Vermont delivering wetland and upland conservation through land protection, restoration, and enhancement.

The Great Lakes/Atlantic Regional Office (GLARO) of Ducks Unlimited is located in Ann Arbor, Michigan and services an 18-state region in the northeastern U.S. The GLARO is one of four DU offices in the U.S., which coordinate and facilitate all aspects of DU's habitat conservation programs in the U.S. – transforming ideas, science and wildlife ecology into completed projects. The GLARO has 42 full-time conservation staff including



biologists, engineers, mitigation and land protection specialists, land surveyors, CAD technicians, construction managers, GIS specialists, project coordinators, accountants, contract compliance managers, legal representation, and administrative assistants (see Appendix I for organizational charts). DU delivers turn-key wetland and stream mitigation projects throughout the country and works extensively with regulatory staff, permittees, partners, landowners and land managers to deliver high quality compensatory mitigation projects that span all types of wetlands, streams, riparian buffer and upland habitats. DU applies a science-based watershed approach to natural resource conservation. Our mission supports delivery of high quality mitigation projects and allows us to use our expertise and our network with partners, land owners, and land managers to pair mitigation funds with lands that are best suited for wetland, stream, and upland restoration and protection as required by compensatory mitigation policies.

DU provides complete, full service delivery of high-quality mitigation projects for permittee-responsible mitigation, in lieu fee programs, and mitigation banks. Ecological services include, but are not limited to:

- Site Identification and Evaluation
- Wetland Delineations
- Hydrology and Soils Investigations
- Wetland and Stream Design and Permitting
- Watershed Planning
- Development of Comprehensive Mitigation Plans
- Development of Mitigation Banking Instruments
- Wetland Construction and Plan Implementation

As-Built Surveys and Documentation
Monitoring Performance
Contingency and Adaptive Management
Long-Term Protection, Conservation Easements
Long-Term Management
Accounting and Financial Assurances

Establishment and Operation

DU intends to establish itself as a qualified ILF Program sponsor for Corps and DEC authorizations in Vermont. As a non-profit conservation organization, DU will work with the Corps and DEC to assure their requirements for resource compensation are being met. An Interagency Review Team (IRT) will advise the Corps on the establishment and management of the DU-VT ILF Program. The team will be comprised of representatives invited by the Corps from other federal, state, tribal and local resources agencies that would have a substantive interest in the establishment and management of the DU-VT ILF Program. The Corps may designate different representatives of the agencies listed above, and may invite additional members to serve on the IRT for individual mitigation projects.

The structure of the DU-VT ILF Program will be outlined in this statewide instrument with a compensation planning framework that describes the program elements, such as service area determination, watershed conditions, priorities and needs, project selection criteria, implementation, credit/debit accounting, and reporting requirements. The instrument will serve as the “umbrella” beneath which mitigation projects around the state will be proposed and implemented. Each mitigation project will have a separate mitigation plan reviewed by the Corps and IRT, signed by DU and the Corps, and added through amendment to the DU-VT ILF Program instrument. Mitigation plans will be developed and implemented in accordance with 33 CFR 332 and the New England District Corps. Mitigation plans will include the following twelve elements:

- 1) Project objectives
- 2) Site selection factors
- 3) Site protection instrument
- 4) Baseline information
- 5) Determination of credits
- 6) Work plan
- 7) Maintenance plan
- 8) Performance standards
- 9) Monitoring requirements
- 10) Long-term management plan
- 11) Adaptive management plan
- 12) Long-term funding mechanism

Wetland delineations and functional assessments will be completed using Corps-approved techniques before and after project implementation to help guide mitigation plan development and evaluate success. DU will remain responsible for the implementation of mitigation plans under the DU-VT ILF Program. DU will act as program manager and report to the Corps on the work conducted programmatically (see Reports Section).

VT In-Lieu Fee Program Description

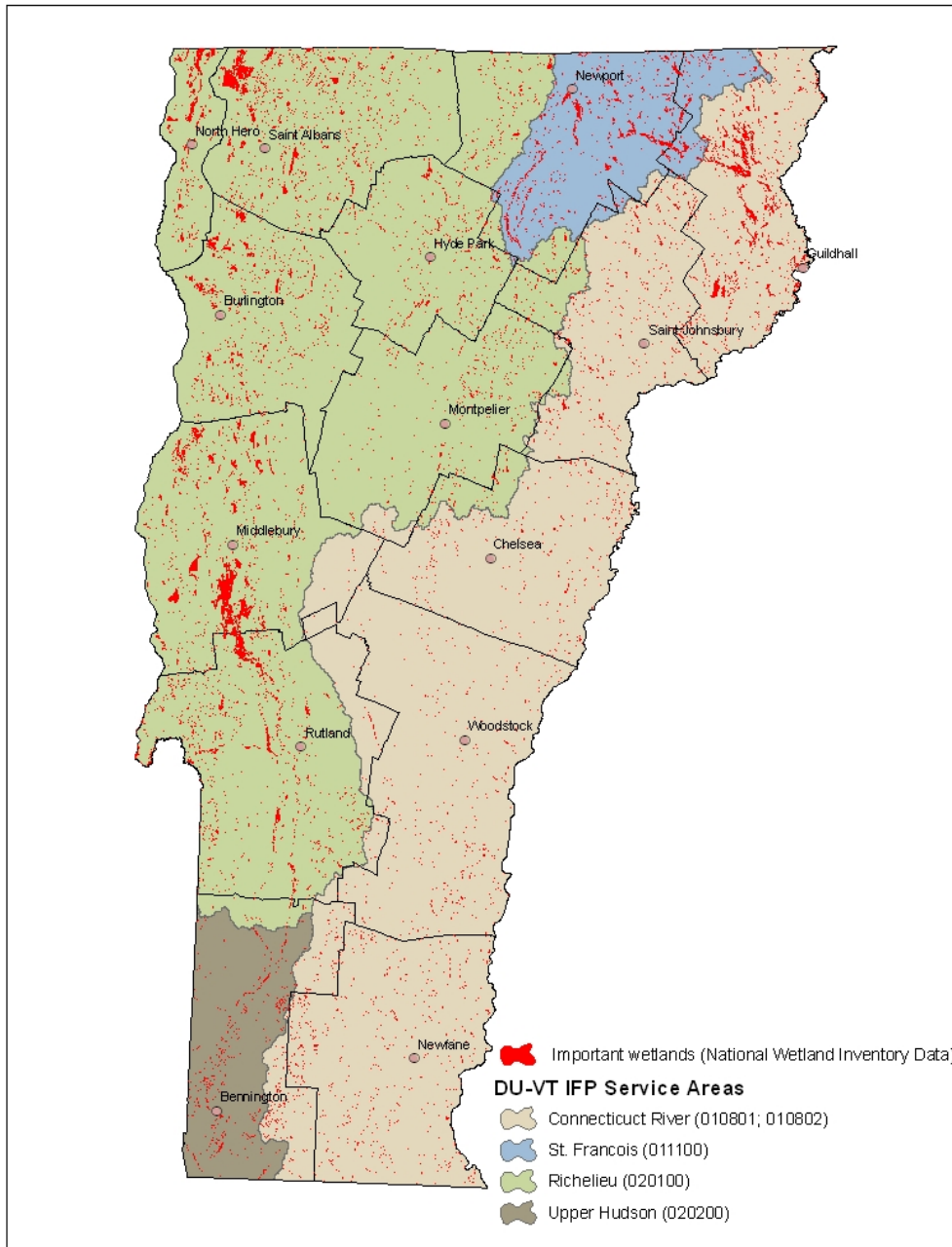
Service area

The geographic service areas for the DU-VT ILF Program, state-wide ILF Program are defined by the major river basin watersheds composed of 6-digit hydrologic unit codes (HUC). They include:

- Connecticut (Upper - HUC 010801 and Lower – HUC 010802)
- St. Francois (HUC 011100)
- Richelieu (HUC 020100)
- Upper Hudson (HUC 020200)

These four river basins are congruent with DEC's basin planning efforts and other resource conservation strategies within Vermont, such as The Vermont Nature Conservancy's (TNC) natural areas protection projects (see compensation planning framework, Appendix IV). These service areas were also chosen because the scale is appropriate to ensure that the projects selected will effectively compensate for adverse environmental impacts across the entire service area. Service areas may include more than one project depending on the number of impacts permitted and the subsequent number of required compensatory mitigation acres.

DU will provide compensatory mitigation for permitted impacts within the same geographic service area in which the impacts occur; unless the district engineer has agreed to an exemption. Individual projects will be proposed for specific service areas in project-specific mitigation plans. Each project will be approved as an amendment to this instrument by going through the process outlined in 33 CFR 332.8(d) or 33 CFR 33.28(g)(2). The appropriate process will be determined by the District Engineer.



DU will use a landscape perspective within service areas to identify types and locations of DU-VT ILF Program projects and subsequently design projects to maximize the watershed benefit and offset impacts to aquatic resources caused by permitted activities. DU will also review TNC Ecoregion Conservation Plans, such as the Lower New England-Northern Piedmont, to assist with isolating conservation targets. DU will use a similar approach as TNC to locate conservation targets on the ground (e.g., plant and animal species) and supplement with larger-scale targets, such as forest and watershed management goals.

Accounting procedures

Upon Corps approval of the DU-VT ILF Program, DU will maintain distinct and separate accounting—hereinafter referred to as the ILF Program Account—of revenue and expense financial transactions and asset management associated with the DU-VT ILF Program. Only credit fees and any interest earned from those fees will be assigned to the ILF Program Account, and those funds will be used for the selection, design, acquisition, implementation, monitoring, management, and Protection of DU-VT ILF Program projects, and administrative costs for DU. Except as otherwise approved by the Corps, non-expended funds from credit sales will be held in federally-insured, interest-bearing financial instruments that may include, but are not limited to, checking accounts, money markets, and certificates of deposits. Any funds or expenditures associated with the DU-VT ILF Program are not eligible as non-federal match for federal grants or other federal programs requiring a cost-share from a non-federal entity.

Provision of legal responsibility

The responsibility to provide compensatory mitigation remains with the permittee unless and until credits are purchased from the DU-VT ILF Program. DU assumes all legal responsibility for satisfying the mitigation requirements of the Corps/state permit or other action for which fees have been accepted. DU will assume the responsibility for all aspects of mitigation, including but not limited to, the identification and selection of sites, property rights acquisition, mitigation plan design and development, construction, monitoring, preservation, and long-term management and maintenance of the required mitigation until the project from which credits were purchased is closed or responsibility is transferred. The transfer of liability from permittees to DU is established by: 1) approval of this in-lieu fee instrument; 2) receipt by the district engineer of a credit sale letter that is signed by DU and the permittee and dated; and documents the transfer of fees from the permittee to DU.

Default and closure provisions

Default

If the Corps determines that DU has failed to provide the required compensatory mitigation within the specified time frame, DU may be determined to be in default. Default determination could be due to failure to: 1) meet performance-based milestones identified in the project-specific mitigation plan, 2) meet ecological performance standards specified in project specific mitigation plans, 3) submit monitoring reports in a timely manner, 4) establish and maintain an annual ledger report and individual ledgers for each project in accordance with the provisions in Section 'accounting procedures', 5) submit an annual financial assurances and

long-term management funding report, 6) report approved credit transactions, 7) complete land acquisitions and initial physical and biological improvements by the third full growing season after the minimum number of advance credits have been sold per service area, and/or 8) otherwise comply with the terms of the instrument and all approved mitigation plans. If default is determined, the district engineer must take appropriate action to achieve compliance with the terms of the instrument and all approved mitigation plans. These actions may include suspending credit sales, decreasing available credits, requiring adaptive management measures, utilizing financial assurances or contingency funds, terminating the agreement, using the financial assurances or contingency funds to provide alternative compensation, directing the use of in-lieu fee program account funds to provide alternative mitigation (such as purchasing credits from an available bank).

Any delay or failure of DU to comply with the terms of this agreement shall not constitute a default if and to the extent that such delay or failure is primarily caused by any force majeure or other conditions beyond DU's reasonable control and that significantly adversely affects its ability to perform its obligations hereunder, such as flood, drought, lightning, earthquake, fire, landslide, effects of climate change on habitat or hydrology, condemnation or other taking by governmental body. Other conditions beyond DU's control will include: interference by third parties; condemnation or other taking by any governmental body; change in applicable law, regulation, rule, ordinance, or permit condition, or the interpretation or enforcement thereof; any order, judgment, action or determination of any federal, state or local court, administrative agency or governmental body; and/or suspension or interruption of any permit, license, consent, authorization or approval. DU shall provide written notice to the district engineer and IRT if the performances of any of the in-lieu fee projects are affected by any such event as soon as it is reasonably practical. Any payments for lands sold that were acquired for DU-VT ILF Program projects will be put back into the appropriate account. Deeds and easements will contain language that, should any of the land be taken by eminent domain or any of the aquatic resource function be diminished, substitute mitigation for lost functions will be provided via funds received into the program account.

Closure

Either party to this agreement may terminate the agreement within 90 days of the written notification to the other party. In the event that the DU-VT ILF Program operated by DU is terminated, DU is responsible for fulfilling any remaining project obligations for which funds have been collected including the successful completion of ongoing mitigation projects, relevant maintenance, monitoring, reporting, and long-term management requirement. DU shall remain responsible for fulfilling these obligations and ensuring the long-term ownership of all mitigation lands has been transferred to the party responsible for ownership and all long-term management of the project.

Fund Allocation and remaining obligations

Excess funds remaining in the DU-VT ILF Program account after the above obligations are satisfied must continue to be used for the restoration, establishment and enhancement, and/or preservation of aquatic resources and associated upland buffers. The Corps shall direct DU to use these funds to provide further restoration, enhancement or preservation activities, or secure credits from another source of third-party mitigation, or disburse funds to another entity such as a governmental or non-profit natural resource management entity willing to undertake further compensation activities. The Corps itself cannot accept directly, retain, or draw upon those funds in the event of a default.

Reports and reporting protocols

Monitoring reports

Monitoring is required of all compensatory mitigation projects to determine if the project is meeting its performance standards and if additional measures are necessary to ensure that the compensatory mitigation project is accomplishing the objective(s). If DU fails to submit reports within 60 days of the deadlines outlined in the mitigation plan(s), the Corps may take appropriate compliance actions (see Default and Closure section).

Project-specific mitigation plans will detail the parameters to be monitored, the length of the monitoring period, the dates that the reports must be submitted, and the frequency for submitting monitoring reports to the district engineer. DU will be responsible for conducting the monitoring and responsible for submitting monitoring reports to the district engineer and the IRT.

Credit Transaction Reports

This instrument establishes the terms by which the legal responsibility for compensation requirements is transferred from the permittee to DU. These terms require DU to submit a credit sale letter to the Corps. The credit sale letter must be signed by DU and the permittee and dated. The credit sale letter must include the permit number(s) for which DU is accepting fees, identify the permittee(s), the permit location(s), the authorized impact acreage(s), and the authorized impact resource type(s). See Appendix II for sample letter.

DU must submit to the district engineer the signed and dated credit sale letter within 30 days of receiving the fees from the permittee.

Annual Program Report

DU will submit an annual report (annual ledger report) to the district engineer and the IRT. The report will be made available to the public upon request. The Corps may post the report on their website. The annual program report will be submitted no later than March 31st of each year and will include summaries of each project from the previous calendar year (January 1 – December 31). The annual report will include the following information:

1) Program account reporting (financial)

- All income received and interest earned by the program account for the program and by service area.
- A list of all permits for which in-lieu fee program funds were accepted by service area including:
 - The Corps permit numbers (and/or state number or Civil Works project name)
 - The service area in which the authorized impacts are located
 - The amount of authorized impacts
 - The amount of required compensatory mitigation
 - The amount paid to the in-lieu fee program
 - The date the funds were received from the permittee
- A description of in-lieu fee program expenditure/disbursements from the account for the program and the service area, including the amount subtracted as the administrative fee for DU.

(see sample report in Appendix III)

2) Ledger reporting (credit)

- The balance of advance credits and released credits at the end of the report period for the program and by service area
- The permitted impacts for each resource type
- All additions and subtractions of credits
- Other changes in credit availability

(see 'credit accounting' section for detail of the ledger report; see sample report in Appendix III)

Annual financial assurances and long-term management funding report

DU will submit an annual report on financial assurances and long-term management to the district engineer and IRT.

DU is required to give the Corps at least 60 days advanced notice if required financial assurances will be terminated or revoked. In addition, the financial

assurance instrument must be written in such a way that it is the obligation of the bonding company or financial institution to provide the Corps notice.

The financial assurances and long-term management funding report will include:

- Beginning and ending balances of the individual project accounts providing funds for financial assurance and long-term management.
- Deposits into and any withdrawals from the individual project accounts providing funds for financial assurances and long-term management
- Information on the amount of required financial assurances and the status of those assurances, including their potential expiration for each individual project.

Compensation Planning Framework

DU's Compensation Planning Framework (Appendix IV), based on a landscape-watershed approach, outlines the framework for selecting, securing, and implementing aquatic resource and associated upland buffer restoration, establishment, enhancement, and preservation under the DU-VT ILF Program.

Ducks Unlimited is the largest private habitat conservation organization that is solely dedicated to the conservation of North American waterfowl and wetlands through partnerships, volunteers, and an expert staff of scientists, engineers, and fundraisers. The Great Lakes/Atlantic Regional Office provides comprehensive conservation solutions to help restore the continent's deteriorating wetlands in 18 states, from Wisconsin to Virginia and north to Maine. DU's conservation approach improves the overall environment through soil and water conservation, improved water quality and flood control, and increased wildlife habitat. Our vision is 'functionally integrated landscapes capable of perpetually sustaining healthy populations of waterfowl and other wildlife through the retention and restoration of their ecological integrity'.

The mission of Ducks Unlimited, Inc. is to conserve, restore, manage wetlands and associated habitats for North Americans waterfowl; these habitats also benefit wildlife and people. To achieve that mission, DU uses an ecosystem approach to large scale planning defined in our International Conservation Plan (ICP, www.ducks.org) with sound scientific principles and adaptive management as the underpinning of all planning exercises. DU adopted an ecosystem approach because it recognizes spatial interrelationships and overlooks jurisdictional boundaries. An ecosystem approach further allows for a step-down approach to conservation delivery in which the largest planning units are defined conceptually by watershed boundaries, whereas operational and specific mitigation plans will occur at the service area/project level as defined in this document.

To effectively target habitat conservation activities, DU had developed several targeting tools across the country to aid in this process. Specifically, with the

purpose of targeting quality wetland restoration and protection activities, we have combined several data layers into decision tools to identifying potential projects on the ground. These tools include base layers of hydric soils, digital elevation, land use and ownership, development trends, water quality rankings, spatial analyses including surrounding landscapes, invasive species type and distribution, to list a few. Further, we have strong relationships with partners and landowners that enable efficient identification of appropriate lands (Key 1-1).

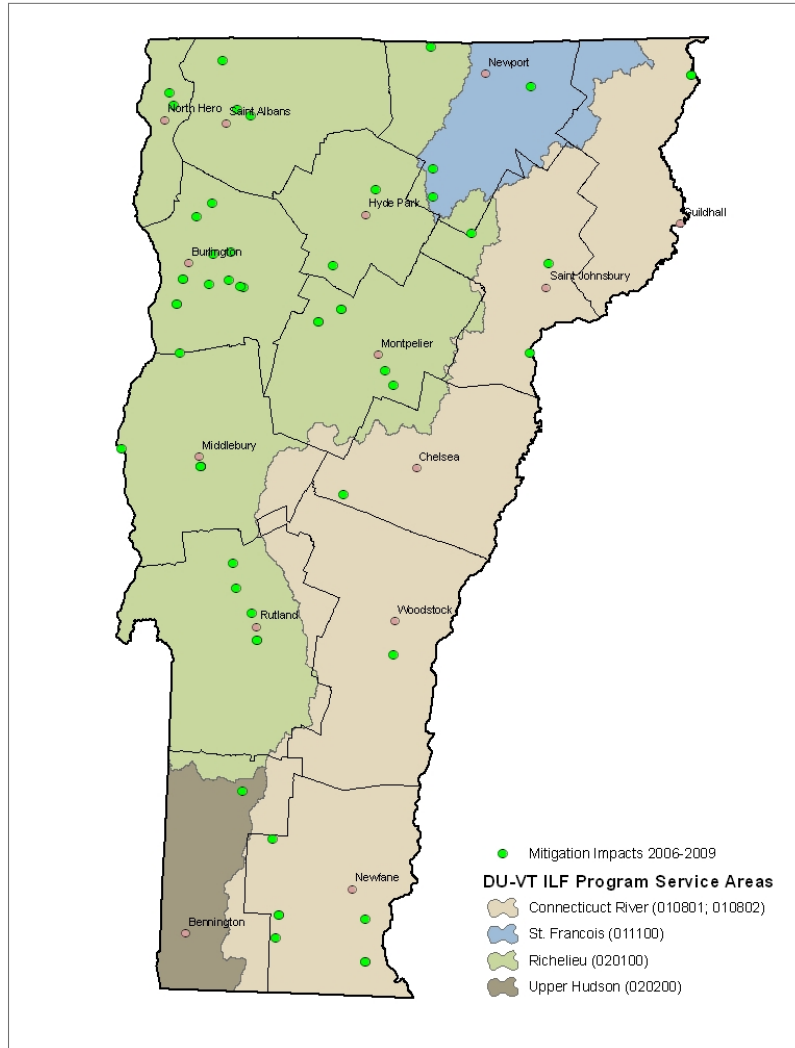
Credit structure

Advanced Credits

Upon approval of this instrument, DU is permitted to sell advanced credits in the amount indicated in the table below. The number of advance credits available for sale varies, are specified by service area, and were determined based on the estimated credits needed to compensate for impacts permitted over the past four years (data provided by R. Ladd, New England District Corps of Engineers, see note on data below*). Acres are used as a stand-in for credits. The District has guidance that provides suggested ratios for various types of wetlands (e.g., palustrine forested). During the permitting process, the Corps will determine the appropriate ratio for each project. In service areas that have experienced relatively few impacts over the past four years, a minimum of 25 advanced credits are needed to finance the program.

Service Area	Advanced Credits* (% of total reported impact acres)
Connecticut River	25 (13%)
St. Francois	25 (5%)
Richelieu	154 (81%)
Upper Hudson	25 (1%)

*advanced credits were estimated using a multiplier because only approximately 50% of the data available from the Corps data base were referenced to lat/long, such that only 80.7 impact acres were attributable to specified service areas, yet 152.1 impact acres were permitted during a 4 year time period. Advanced credits above represent an estimated demand over a 5 year period assuming non-spatial data are distributed proportionately to reported spatial impact sites. See below for the distribution of known mitigation impact sites by service area.



Advanced credits will be converted to released credits as milestones specified in specific mitigation plans are achieved. Credit release schedules may vary by project and will vary between restoration/enhancement and preservation. For example, a typical credit release schedule for restoration/enhancement might include a 20% release at approval of the mitigation plan, further release of 20% at as-built production, 15% after the first year of successfully meeting the monitoring performance standards, 15% after the second year of successfully meeting the monitoring performance standards, 15% after the third year of successful monitoring, and the final 15% upon Corps sign-off. A typical release schedule for preservation might be 75% credit release at the signing of the preservation documents and the final release of 25% once financial assurances are documented and in place.

Once DU has sold advance credits, additional advance credits may be sold when an equivalent number of credits have been released in accordance with the approved credit release schedule outlined in a project specific mitigation plan. Once advance credits are fulfilled, an equivalent number of advance credits may be made available for sale, at the discretion of the district engineer and IRT.

DU will complete land acquisition, land securement, and initial physical and biological improvements for a project by the end of the third full growing season after receipt of the first DU-VT ILF Program payment. If DU fails to meet this deadline, the district engineer must either make a determination that more time is needed to plan and implement an in-lieu fee project or, direct DU to disperse funds from the DU-VT ILF Program account to provide alternative compensatory mitigation to fulfill those compensation obligations.

Project-specific credits and fee schedules

Fees for the DU-VT ILF Program are based on a full cost accounting analysis of the expected costs associated with the restoration, establishment, enhancement, and/or preservation of aquatic resources and associated upland buffers in the service areas described in this instrument in VT. The program costs in this analysis include land acquisition, project planning and design, construction, plant materials, labor, legal fees, monitoring, remediation or adaptive management measures, program implementation, contingency costs over the life of the project, establishment of a long-term management and protection fund, financial assurances that are expected to ensure successful completion of the in-lieu fee project, an administrative fee, and may reflect other factors as deemed appropriate by DU. These fees will be reviewed annually by DU and will be adjusted as necessary to represent full cost accounting of project expenses. The fee schedule will be provided to the New England Corps District, Regulatory Division, Policy Analysis, and Technical Support Branch, so that Corps staff can provide the information to permit applicants. (see Appendix V for 2010 credit fee schedule)

Credits generated will be determined at the time each project is proposed for funding and using the current New England District compensatory mitigation guidance ratios in place at that time.

In-Lieu Fee Program Account

The DU-VT ILF Program account will track funds accepted from permittees separately from those accepted from other entities and for other purposes. The account will be held at a financial institution that is a member of the Federal Deposit Insurance Corporation. All interest accruing from the account will be used to provide compensatory mitigation for impacts to aquatic resources.

The Program account will be established before any fees are accepted. The Corps has the authority to audit the program account records at any time.

Funds paid into the DU account may only be used, after payment of the administrative fee addressed below, for the restoration, establishment, enhancement, protection, and management of aquatic resources and associated upland buffers. This means the selection, design, land acquisition (i.e., appraisals, surveys, title insurance, etc), implementation, and management of in-lieu fee compensatory mitigation projects. This may include, but is not limited to, fees associated with securing a permit for conducting mitigation activities, activities related to restoration, enhancement, establishment, and/or preservation of aquatic resources and associated upland buffers, maintenance and monitoring of mitigation sites, and the purchase of credits from mitigation banks or any other fee related to the mitigation process contemplated by this program. For sample reports see Appendix III.

DU will receive an administrative fee of 15% of the funds when funds are deposited into the DU Program account. The administrative fee will come from the deposited funds and is deemed to represent and reimburse reasonable overhead and related costs of administering the DU-VT ILF Program to accomplish the mitigation projects described herein.

Credit accounting

DU will establish and maintain an annual report ledger that tracks the production of released credits for DU-VT ILF Program and for each individual in-lieu fee project.

DU will track the fees and all other income received, the source of the income, and any interest earned by the program account. The ledgers will include a list of all permits for which in-lieu fee program funds were accepted, including the appropriate permit number, or other identifier (Corps, state or Civil Works), the service area in which the specific authorized impacts are located, the amount (acreage or linear) of authorized impacts, the aquatic resource type impacted (by Cowardin class), the amount of compensatory mitigation required, the amount paid to the in-lieu fee program for each of the authorized impacts, and the date the funds were received from the permittee.

DU shall establish and maintain a report ledger for DU-VT ILF Program that will track all program disbursements/expenditures and the nature of the disbursement (i.e. costs of land acquisition, planning, construction, monitoring, maintenance, contingencies, adaptive management, and administrative). DU may also track funds obligated or committed, but not disbursed.

The ledger will also include, for each project, the permit numbers for which the project is being used to offset compensatory mitigation requirement, the service area in which the project is located, the amount of compensation being provided by method (i.e., restoration, establishment, enhancement, or preservation), the aquatic resource type represented (e.g., Cowardin Class and Hydrogeomorphic Class for wetlands), the amount of compensatory mitigation being provided (acres

and/or linear feet), and the number of credits certified by the IRT. For sample reports see Appendix III.

The annual report ledger will also include a balance of advance credits and released credits at the end of the report period for each service area.

Long term management and financial arrangements

DU has over 70 years experience in the restoration and protection of wildlife habitat, including holding and managing lands and easements. In some cases, DU will be the conservation easement holder or will maintain ownership of land acquired with DU-VT ILF Program funds. In other cases, DU will work with qualified partners and/or buyers via existing relationships. After securing approval from the District Engineer, DU may transfer long-term management responsibility to a public agency, land steward entity, non-governmental organization or private land owner. Transfer of long term management responsibilities will not occur until after performance standards have been met. Once long term management has been transferred to another entity, the party is thereby responsible for meeting any and all long-term management responsibilities outlined in the project-specific mitigation plan. Until such time of transfer, DU shall be considered responsible for long-term management of the mitigation project. To ensure financial viability of long-term management, a percentage of each credit value will be held as financial assurance for long term management, contingency and remedial actions.

If DU chooses to transfer the responsibilities for the long-term management to a long-term steward, DU must seek Corps' approval. The Corps must be given the option of being a signatory to any contract or other arrangement assigning the rights and delegating the responsibilities to the steward.

If long-term stewardship responsibilities are transferred to a land steward, DU shall also transfer the long-term management funds or otherwise arrange for disbursements from such funds to the land steward entity.

Signatures:

A. Dale Hall, CEO

Date: 1/6/11

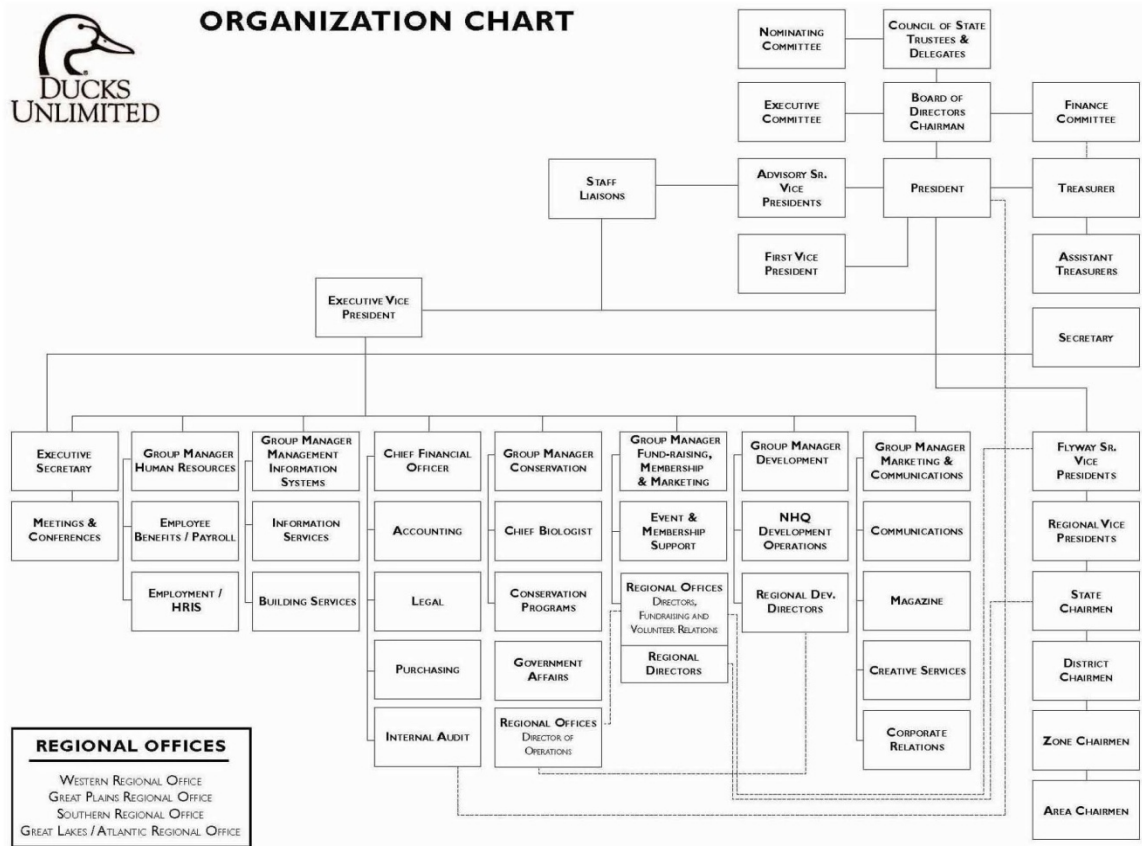
Program Sponsor
Ducks Unlimited, Inc.

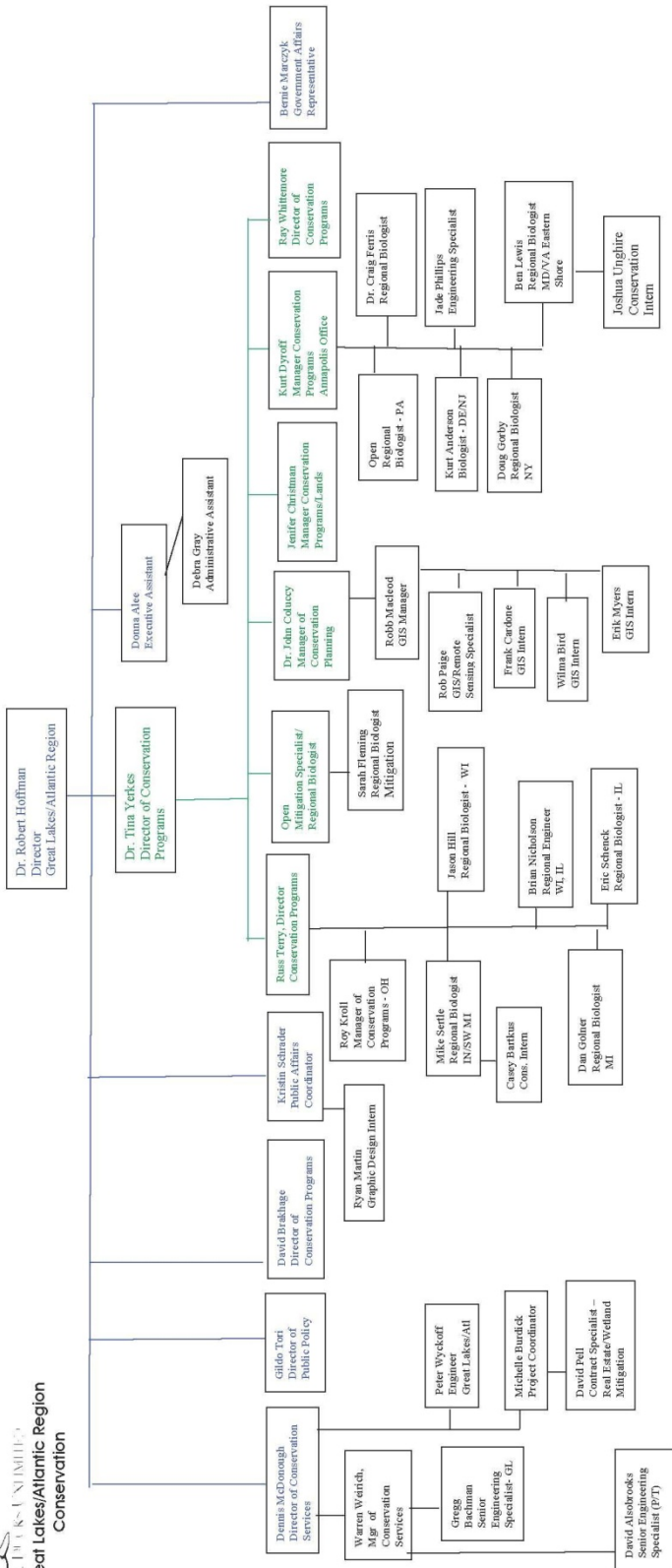
Philip T. Feir

Date: 4 January 2011

Philip T. Feir:
Colonel, Corps of Engineers
District Engineer

Appendix I: Ducks Unlimited, Inc. National and Regional Organizational Charts





Rev. 2/16/2010

Appendix II: Sample Credit Sale Letter

Chief, Regulatory Division
New England District Corps of Engineers
696 Virginia Road
Concord, MA 01742-2751

Date

RE: Statement of Receipt of Fee

PERMIT NUMBER(S)
PERMITTEE
PERMIT LOCATION (street, town)
AUTHORIZED IMPACT ACREAGE
AUTHORIZED IMPACT RESOURCE TYPE(S)

DU has a signed In-Lieu Fee agreement dated ????? with the US Army Corps of Engineers, New England District, to establish and operate the DU VT In-Lieu Fee Program.

This letter confirms receipt of \$X for the above Corps-authorized project on [DATE].

By accepting this fee, DU is responsible for use of these funds, less the 15% administrative fee, to provide compensatory mitigation for the above-described impacts

DU representative signature

Date

Permittee signature

Date

Appendix III: Sample Annual Reports a) program account reporting and b) credit reporting. These reports may be adapted to a better format once reporting begins, but will contain the same basic information.

a) Program Account report

Income Statement

Service Area	Permit No.	Credits sold	Fee with Admin Fee Deducted	Interest Earned	Expense Summary	Funds Available
	1 xxx-yyy-zzz	3	255,000	7,650	217,000	45,650
	1 xxx-yyy-zz2	5	425,000	12,750	115,000	322,750
service area total		8	680,000	20,400	332,000	368,400
	2 xxx-yyy-aaa	5	531,250	15,938		547,188
	2 xxx-yyy-aa1	8	850,000	25,500		875,500
service area total		13	1,381,250	41,438	0	1,422,688
Program Total		21	2,061,250	61,838	332,000	1,791,088

Expense Statement

Service Area	Permit No.	Mitigated Acres	Expense	Category or Description
	1 xxx-yyy-zzz	3		80,000 land securement 12,000 mitigation plan, survey and design 125,000 construction, as-builts
			<i>total to date</i>	<i>217,000</i>
	1 xxx-yyy-zz2	5		100,000 land securement 15,000 mitigation plan, survey and design
			<i>total to date</i>	<i>115,000</i>

b) Credit Report

credit report summary

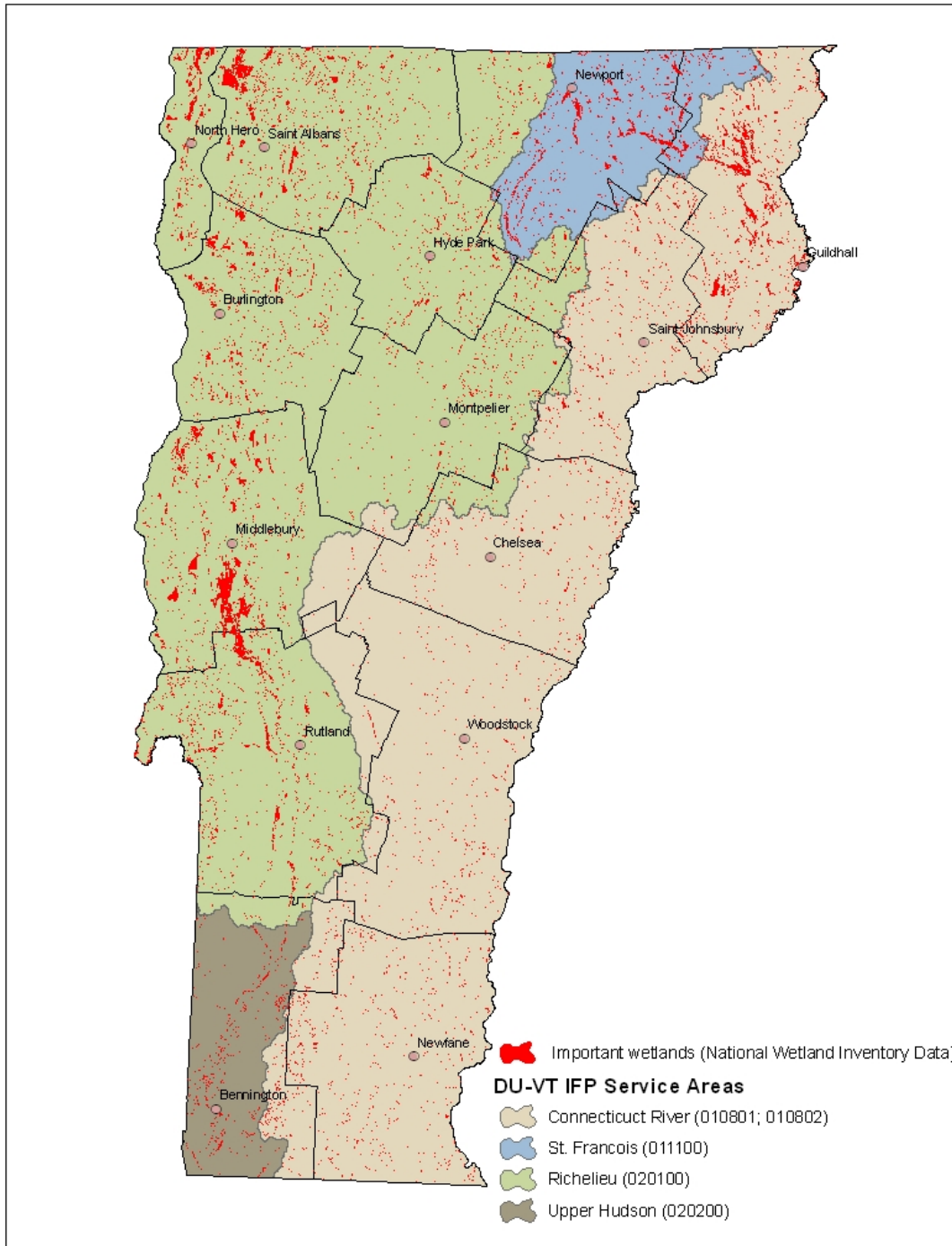
Service Area	Date	Advanced Credits	Advanced Credits Sold	Balance of Advanced Credits	Released Credits
1	7-Aug-10	100			0
	10-Aug-10		25	75	0
	12-Aug-10		5	70	0
2	7-Aug-05	100			
	10-Aug-05		10	90	
	10-Aug-08	10		100	10
	12-Aug-08		10	90	
	1-Sep-09		10	80	
	1-Sep-10	10		90	10

detailed credit report

Service Area	Permit No	Authorized Impacts (acres)	Mitigated Acres	Authorized impact detail			Mitigated acres detail	
				resource 1	resource 2	etc	resource 1	resource 2
1	xxx-yyy-zzz	1	3	0.5	0.5		restored enhanced protected	1.5 1.5
2	xxx-yyy-aaa	1	5	0.5	0.5		restored enhanced protected	 1.5 3.5

Appendix IV: Compensation Planning Framework

Ducks Unlimited, Inc.'s Watershed-Based Compensation Planning Framework for the DU-VT ILF Program



Introduction to the Comprehensive Planning Framework

The DU-VT ILF Program, as described in the preceding instrument, is a compensatory mitigation fund sponsored by Ducks Unlimited, Inc. The DU-VT ILF Program will be used for compensatory mitigation for unavoidable impacts to waters of the United States. Permits are required by the U.S. Army Corps of Engineers (Corps) through the Clean Water Act Section 404 for discharge of dredge or fill materials within “waters of the U.S.”; through the Rivers and Harbors Act Section 10 for structures or work in or affecting navigable water of the U.S.; and by the Vermont Department of Environmental Conservation (DEC) under section 8.5 of the Vermont Wetland Rules. These regulatory agencies require that aquatic resource functions and services lost due to impacts be replaced through compensatory mitigation after addressing avoidance and minimization of impacts.

The following Compensation Planning Framework, based on a landscape-watershed approach, outlines the framework for selecting, securing, and implementing aquatic resource and associated buffers restoration, establishment, enhancement, and preservation under the DU-VT ILF Program.

This compensation planning framework includes the following required 10 elements:

- I. Geographic service areas including a watershed-based approach for the delineation of service areas
- II. Description of threats and how the program will offset the impacts
- III. Historic aquatic resources
- IV. Current aquatic resources conditions supported by field documentations
- V. Statement of aquatic resource goals/objectives
- VI. Prioritization strategies for selecting and implementing mitigation projects
- VII. Preservation strategies
- VIII. Stakeholder involvement
- IX. Long term protection and management strategies
- X. Program evaluations and reporting

The mission of Ducks Unlimited, Inc. is to conserve, restore, manage wetlands and associated habitats for North Americans waterfowl; these habitats also benefit wildlife and people. To achieve that mission, DU uses an ecosystem approach to large scale planning defined in our International Conservation Plan (ICP, www.ducks.org) with sound scientific principles and adaptive management as the underpinning of all planning exercises. DU adopted an ecosystem approach because it recognizes spatial interrelationships and overlooks jurisdictional boundaries. An ecosystem approach further allows for a step-down approach to conservation delivery in which the largest planning units are defined conceptually by watershed boundaries, whereas operational and specific mitigation plans will occur at the service area/project level as defined in this document. In Vermont,

which is part of DU's Great Lakes Atlantic Region, the focus is on forested wetlands, as well as emergent wetlands.

Increasing forest and habitat fragmentation resulting from the parcelization of land and the expansion of roads and trails threaten the preservation of Vermont's natural heritage and its wildlife. Additional threats to wildlife include pollution, sedimentation, invasive species, climate change, and data gaps (Vermont Wildlife Action Plan 2005). Therefore, Vermont DEC has increased efforts to manage priority habitats. Vermont adapted a Wildlife Action Plan what functions as state-level framework for ecological restoration and the most common strategies proposed to alleviate impacting species and habitat with conservation need include, but are not limited to conduction habitat restoration and encouraging wildlife compatible resource use (Vermont Wildlife Action Plan 2005). The DU-VT ILF Program strategies will directly benefit Vermont conservation goals, as outlined by DEC, TNC, USFWS, and other conservation partners.

To effectively target habitat conservation activities, DU had developed several targeting tools across the country to aid in this process. Specifically, with the purpose of targeting quality wetland restoration and protection activities, we have combined several data layers into decision tools to identify potential projects on the ground. These tools include base layers of hydric soils, soil features (NRCS Web Soil Surveys), digital elevation, land use (i.e., agricultural landscapes), development trends, water quality rankings, spatial analyses including surrounding landscapes, invasive species type and distribution, National Wetland Inventory data, and conservation/protected lands distribution. Further, we have strong relationships with partners (i.e., federal, state, and NGOs) and landowners that enable efficient identification of appropriate lands. Many partners have extensive lists of priority lands that are targeted for restoration (e.g., TNC priority natural areas). DU currently has a list of over 100 DU members that are Vermont private landowners interested in volunteering their land for habitat restoration/conservation. DU cooperates with its partners and members to isolate potential restoration and protection sites. Potential sites for the ILF Program will be selected and evaluated using selection criteria mentioned throughout this document (Key 1-1) and will target priority conservation habitat.

Ecological and functional parameters for successful wetland restoration and protection will be prioritized to ensure the success of a DU-VT ILF Program Project. Projects will include the following variables and are emphasized through out the watershed conservation planning framework for each service area:

- a) The project will be evaluated for its ability to result in successful and sustainable net gain of aquatic resource area and/or function.
- b) Multiple objectives: Projects will be evaluated based on their potential to address multiple functions and services such as improvement of fish and wildlife habitat, support for rare species, flood attenuation, water quality improvement, and recreation or education values. Projects that can utilize

- native plant community diversity and natural processes will yield greater functional gains and be given higher preference.
- c) Support regional conservation initiatives and is compatible with the surrounding landscape: Projects should be located where they compliment adjacent land uses, meet regional conservation priorities, address limiting factors in watersheds, increase habitat diversity, support state wildlife action plans, reduce fragmentation, establish corridors and enhance the function of existing natural areas.
 - d) Project costs: Projects with high aquatic resource functional gain per dollar will be given preference.
 - e) Address water quality issues: Focus on the most degraded areas or most severe water quality issues important for maintaining or improving ecosystem functions.

Element I: Geographic service areas and delineation

According to Mitsch and Gosselink (2007) and Vermont DEC Water Quality Division, Vermont has lost over 35% of its original 341,000 acres of wetland habitat. Aquatic resource habitats in Vermont include lacustrine (lake), fluvial (streams and rivers), floodplains forests, shores, and marsh systems. The palustrine wetlands consist of peatlands, forested, shrub-scrub, and marshes. Lacustrine habitats include open water, aquatic beds, with over 23,400 acres of unclassified near-shore wetlands associated with Lake Champlain. Finally, riverine wetlands cover about 174 acres within the state. Unfortunately, data on historic wetland loss at the watershed level is lacking for Vermont (Ralph Tuner, Head the National Wetlands Inventory, R5 - Northeast Region, U.S. Fish and Wildlife Service, personal communication). Therefore, selection of mitigation service areas will focus on enhancing and restoring the current palustrine, lacustrine, riverine aquatic resources and associated upland buffers, and early-succession habitat.

The DU-VT ILF Program geographic service areas were selected based on several criteria: a watershed approach, existing planning efforts in VT, and internal DU planning efforts. Vermont DEC has a Watershed Initiative which provides guidelines for protecting high quality river basins and restoring habitats and other important impaired water resources. The watershed and associated river basins share common zoogeographic history, physiographic, and climatic characteristics, thus, have distinct assemblages of freshwater habitats. The Vermont DEC river management goal is to support and implement channel assessment and management practices that recognize waterbodies' natural functions and values. Riparian (riverbank) areas can serve as corridors for numerous wildlife species, and also assist with reduction of sediments, provide organic inputs, and regulate water chemistry. Therefore, riparian areas are also a conservation target because they provide protection from headwaters and downstream receiving waters, and improve water quality. The Vermont Natural Heritage Program, Wildlife Action Plan, and TNC priority conservation areas goals and objectives are also included

when selecting services areas. The DEC identified 17 major river basins and associated watersheds for conservation (Figure 1)

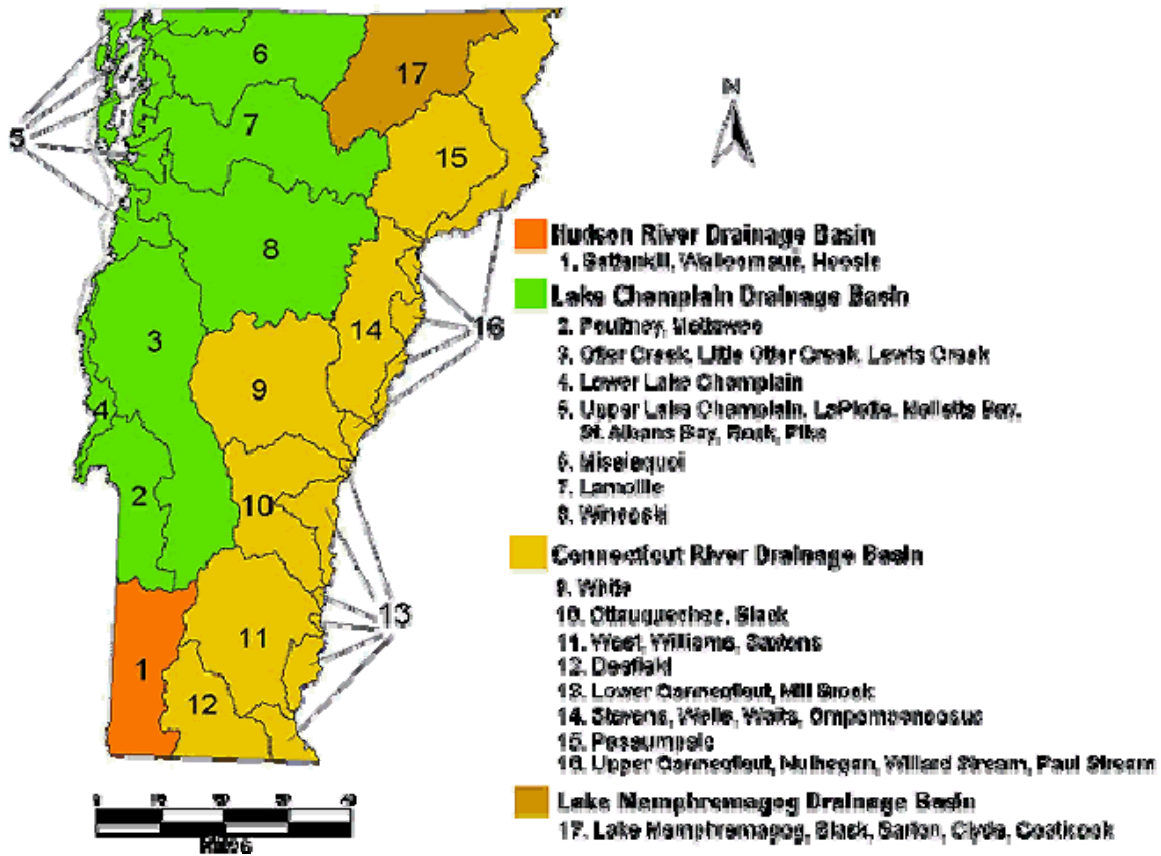


Figure 1. Major river basins identified for conservation by Vermont Department of Environmental Conservation (DEC 2003).

DU’s service area stratification mirrors the DEC’s current watershed conservation efforts and serves as a framework for a watershed approach to prioritizing restoration, establishment, enhancement, and preservation of aquatic resources and associated upland buffers. DU has identified four major river basins to function as service areas for Vermont’s DU-VT ILF Program. These four river basins include: (1) Connecticut (Upper – HUC 010801 and Lower –HUC 010802), (2) St. Francois (HUC 011100), (3) Richelieu (HUC 020100), and (4) Upper Hudson (HUC 020200; Figure 1). Using sound science, targeted mitigation projects within the watersheds will enable project design to achieve effective compensation, maximum benefits to the watershed, and improve project success and sustainability.

The service areas were also chosen because the scale is appropriate to ensure the projects selected will effectively compensate for adverse environmental impacts across the entire service area and enable financially sound delivery of the program (smaller service areas are not financially viable due to impact history). Service areas may include more than one project depending on the number of impacts permitted and the subsequent number of required compensatory mitigation acres. DU will provide compensatory mitigation for permitted impacts within the same geographic service area in which the impact occurred; unless the district engineer has agreed to an exemption. Individual projects will be proposed for specific service areas in project-specific mitigation plans. DU will use a landscape perspective within service areas to identify types and locations of DU-VT ILF Program projects and subsequently design projects to maximize the watershed benefit and offset impacts to aquatic resources and their associated upland buffers caused by permitted activities.

In addition to the scientific databases developed and available to DU, and discussed in the introduction, the following factors will also be considered when targeting specific mitigation projects within each service area:

- Focus areas from the Wildlife Action Plan
- Heritage data for rare plants and communities
- Key information from non-profits and land trusts (TNC, VT Land Trust, VT Audubon, VT Natural Resources Council, etc.)
- Past mitigation needs in the watershed based on historical impacts
- Future needs for mitigation in the watershed based on projected growth and development
- Aquatic resource and associated upland buffers conservation needs and opportunity
- Lack of private mitigation banks suitable to meet the demand for mitigation in the service area
- Partner/Stakeholder input, target locations for state, federal, and NGO agencies to increase contiguous habitat.
- Relationship to other protected lands

Vermont's landscape is rich with mountains, valleys, woods, and wetlands and these habitats support a diversity of wildlife. The Vermont Department of Environmental Conservation has stated that one of their missions is to "Conserve, enhance and restore Vermont's natural communities, habitats, and species and the ecological processes that sustain them". Vermont DEC initiated a wildlife conservation plan in 2005 that has been mandated as the framework for wildlife conservation in Vermont. Therefore, DU will ensure the development of the DU-VT ILF program will address the goals and objectives of Vermont's Wildlife Action Plan, especially for wetland habitats and wetland dependent wildlife. Vermont's Wildlife Action Plan will serve as a science-based foundation to address conservation goals for the DU-VT ILF Program. Habitat loss, such as, loss of wetlands and early succession lands are a primary target for the Wildlife Action

Plan, and the DU-VT ILF Program should assist at addressing the recommended actions to Conserve Vermont's wildlife.

Examples of Recommended Habitats to Conserve Vermont's Wildlife per the Wildlife Action Plan (Vermont DEC 2005):

- 1) River, Lake Shorelines and floodplain forests- prioritize for conservation existing continuous riparian corridors and associated wildlife habitat by improving stream flow and floodplain forests, and maintain/restore critical habitat for fish and wildlife.
- 2) Rivers/Streams – Conserve riparian and fluvial habitat by monitoring, protecting, and restoring water quality from excessive nutrient and sediment loading.
- 3) Lakes – restore riparian, shoreline, and littoral habitats, invasive species control, and acquire conservation easements for protection.
- 4) Landscape Forest - provide a network of interconnected habitats, ensure long-term protection and restoration of ecological functions.
- 5) Vernal pools –provide protection, management, and education.
- 6) Open Shrub Wetlands – Prevent the loss of existing habitat by developing management plans, acquire easements on high priority areas, and their ensure protection of ground water recharge areas.

Similarly, the USFWS Vermont Partners for Fish and Wildlife (2001) have also identified critical areas for protection and restoration that will benefit from the DU-VT ILF Program:

- 1) Restore and protect river miles using techniques that address bank erosion
- 2) Restore 5,000 miles of riparian habitat to provide critical areas for migrating songbirds and buffer areas for healthy river systems
- 3) Assist with interagency efforts to reduce annual phosphorus loads in to waterways
- 4) Restore and enhance wetlands to provide benefits to migratory waterfowl and other wetlands birds.
- 5) Integrate rare natural community restoration and protection into the agricultural landscape with emphasis on floodplain forests, hardwood swamps, and clay plain forests.
- 6) Treat and restore wetland and upland habitat degraded by invasive non-native species.

Elements II, III, IV, and V: Includes description of threats to aquatic resources, historical and current resources lost in each service area, and statement of goals and objectives.

SERVICE AREA 1: *Connecticut River Watershed.*

The Connecticut River is New England's longest river and flows more than 410 miles from northern New Hampshire to the Atlantic Ocean at Long Island Sound, draining more than 11,000 square miles. The Connecticut River watershed in

Vermont is located along the eastern side of the state and runs along the Green Mountains (Figure 2). The watershed includes 41% of Vermont's total land area and lies within 114 towns running along most of Interstate Highway 91. There are five headwater regions of the Connecticut River watershed, (e.g., Canaan, Lemington, Bloomfield, Brunswick, and Maidstone) that provide extensive river and lake shorelines, flooded forests, and wetland habitats for a variety of fish and wildlife.



Figure 2: Map of Connecticut River Watershed.

The Connecticut River Watershed has rich agricultural soils and extensive forests. Since the mid-1800s, significant alterations, such as dam construction, logging, farming, deforestation, dredging, and river straightening have altered water quality, and wildlife habitat, and led to significant loss of floodplain functions (Figure 3). The increased power of the contained river has resulted in bank erosion, sediment loss, and nutrient storage (Figure 4). Currently, the watershed is threatened with over-exploitation of resources and a growing human population. Therefore, current management and conservation projects often focus on sustaining, restoring and enhancing water quality and wetland habitat. Vermont's Connecticut River Watershed has been both of economic and environmental value to the state, and has been a target for conservation agendas by federal, state and non-government organizations. For example, the Connecticut River Joint Commissions serves as a focal point for agencies and citizens to ensure responsible development and sound

environmental protection. Similarly, the Vermont DEC has prepared a Watershed Initiative as a guide for developing river basin water quality management.

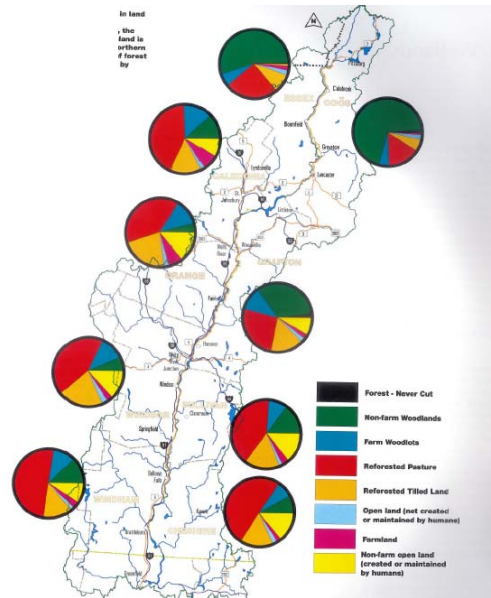


Figure 3. Land use legacies in the Connecticut River Watershed. Map presents the changes in land use over 200 years in the watershed. The reforestation of former farmland is particularly evident. In the north the predominance of forest land remains (Taken from Brown 2009).

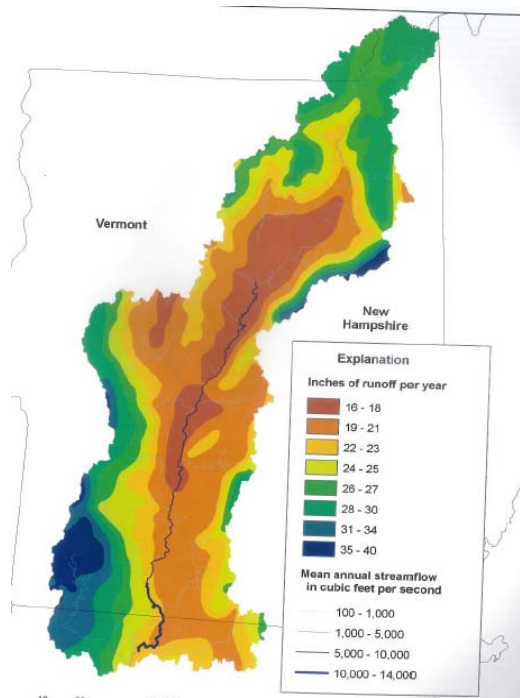


Figure 4. Effective runoff in the Upper Connecticut River Watershed (Taken from Brown 2009).

The Vermont Watershed Initiatives focus conservation efforts on restoring waters most affected by polluted discharge, protecting waters and adjacent access threatened by pollutants and other impairments, and establishing management goals for waterways. Similarly, Vermont's Partners for Fish and Wildlife (2001) has also targeted similar habitats as the Watershed Initiatives, such as protection of riparian areas through re-vegetation, wetland restoration, upland shore, natural community restoration, floodplain forests, grassland, maintenance of early succession habitat, and protection. The Connecticut River has been reported to have good to poor water quality condition (i.e., adequate dissolved oxygen, and excellent condition of the aquatic food web, but high sediment loads and nitrification), as reported in the Connecticut River Water Resource Management Plan. Therefore, continued monitoring, restoration, and protection efforts target the River's riparian zones, drainage basins, and associated wetlands in order to maintain a diversity of habitats, communities, and resources.

Goals for the Connecticut River and its Environment. (Adapted from "The Connecticut River Corridor Management Plan" issued by the Vermont Connecticut River Watershed Advisory Commission; **Bold** bullets represent goals for the Connecticut Watershed that will be assisted by the DU-VT ILF Program.)

- 1) Continue progress towards restoring and maintaining fishable, swimmable river with a healthy ecosystem with no degradation as a result of human activities.
- 2) Maintain biodiversity of wildlife and associated habitats (e.g., fish, migratory birds, anadromous fish, and other native wildlife/fish).**
- 3) Protect connected open lands and forests.**
- 4) River shore and floodplain remain undeveloped.
- 5) Continue to provide the public with best management strategies to minimize impacts (i.e., farming and forestry practices).
- 6) Maintain and enhance riparian zones.**
- 7) Encourage conservation easements.**
- 8) Minimize wastewater discharge.
- 9) Encourage regular monitoring of water quality.
- 10) Ensure accurate and current information on permit regulations for developers.
- 11) Enforce state regulations.
- 12) Maintain early succession habitats
- 13) Support contiguous habitat**
- 14) Prevent habitat loss by protecting critical lands through conservation easements**
- 15) Integrate rare natural communities onto the landscape with emphasis on floodplain forests, hardwood swamps, and clay plain forests**
- 16) Reduce pollutant discharge into waterways**
- 17) Aquatic invasive species control**
- 18) Restoration of wetland micro-topography**
- 19) Restore declining natural communities (e.g., native trees and shrubs)**

20) Prevent the loss of existing habitat by developing management plans, on high priority areas

A primary goal for the Connecticut River Watershed is to sustain habitat for Fish and Wildlife.

1) Management of Fisheries: The River offers some of the most variable habitats which support, trout, shad, Atlantic salmon, walleye, bass, perch, and other species. Therefore, restoration efforts are in place to improve habitat and fish passages (e.g., eliminate restriction caused by dams). Although the DU-VT ILF Program is not directed at fisheries management, conservation and enhancement of riverine and wetland systems will benefit all aquatic wildlife.

2) Improvement of riparian, aquatic habitat, and associated upland buffer values: Riparian habitats are valuable for wildlife and fish, and are in limited supply. Therefore, conservation, restoration, and protection efforts should be focused on this critical habitat, but also extend efforts to forests and fields to reduce sediment and containment loads from landscape runoff.

3) Minimize zebra mussel and exotic species introduction: The Watershed is currently free of zebra mussel infestations and efforts are in place to ensure they do not contaminate the waterway. Current threats include Eurasian Milfoil which was first discovered in the watershed in 1995. Although the DU-VT ILF Program is not directed to exotic species management, conservation and preservation of native species and control of invasive species should minimize the spread of exotic species.

Current Threats:

- 1) Wetland loss
- 2) Invasive and/or non-native species
- 3) Loss and destruction of riparian zones
- 4) Global climate change (water temperature extremes)
- 5) Recreational use
- 6) Contaminant loading by water pollution (e.g., storm run off)
- 7) Watershed development
- 8) Dams and water flow alterations
- 9) Overfishing
- 10) Shoreline and floodplain development
- 11) Waste water discharge

Priority Conservation within the Connecticut River Service Area:

The principal tributaries of the Connecticut River will provide a framework for conservation target locations (Table 1). Of the 16 areas identified by the

'Biological values of the Connecticut River Watersheds Special Focus Areas' report, all include wetlands as a conservation target. DU-VT ILF Program will directly address the threats and impacts to the Connecticut River Service area via restoration and protection of wetlands, a top priority in this watershed.

Table 1. Conservation Areas in the Connecticut River Service Area (Adapted from US Fish and Wildlife Service "Biological Values of the Connecticut River Watershed's Special Focus Areas.").

Location	Area (acres)	Targets	Endangered/ rare species found in area
Black River	130,560	Wetlands and associated upland buffers , rare species	
Deerfield River	424,960	Wetlands, upland buffers , rare species	
Headwater areas	194,560	Wetlands, upland buffers , rare species	
Nulhegan River	96,640	Rare species, wetlands, waterbirds, contiguous habitat , unique habitat, migratory landbird habitat, upland buffers	Spruce grouse, 13 rare plants
Ompompanoosuc River (i.e., Macrosite)	87,040	Federally listed species, rare species, waterbirds, rare species, wetlands and upland buffers	Dwarf wedge mussel, Jesup's milk vetch
Ottauquechee River	142,080	Wetlands , rare species, upland buffers	
Passumpsic River	324,480	Wetlands , rare species, upland buffers	
Paul Stream	37,120	Fisheries, waterbirds, wetlands, upland buffers	Native brook trout, black ducks
Great Meadows	55	Wetlands, Waterbirds, upland buffers	Black ducks, Salmon, black-crowned night herons, blueback herring.
Saxtons River	49,920	Wetlands , rare species, upland buffers	
Stevens River	31,360	Wetlands , rare species, upland buffers	
Waits River	93,440	Wetlands , rare species, upland buffers	
Wells River	64,000	Rare species, fisheries, contiguous habitat ,	

		wetlands, upland buffers	
West River	270,720	Wetlands, upland buffers , rare species	Blueback herring, Atlantic salmon
White River	455,680	Fisheries, contiguous habitat , unique habitats, wetlands, upland buffers	Atlantic salmon
Williams River	75,520	Wetlands , rare species, upland buffers	

Bold font represents watershed conservation targets that will directly benefit from the **DU-VT ILF Program**.

Conservation Areas: (Details about watersheds were adapted from “The Connecticut River Corridor Management Plan” issued by the Vermont Connecticut River Watershed Advisory Commission, and Vermont DEC, Water Quality Division, Specific Basin and Planning Activities, unless other wise stated):

A) Black River and Ottauquechee River: The Black River Watershed drains an area of 130,560 acres, and passes through Amherst and Echo Lakes, and Lakes Rescue and Pauline. The Ottauquechee River has a drainage area of 142,080 acres, and originates on the eastern side of the Green Mountains. There are 9 tributaries, North Branch, Woodward Brook, Reservoir Brook, Broad Brook, Pinney Hollow Brook, Kedron Brook, Barnard Brook, Gulf Stream, and Barnard Brook. Both Upper and Lower Connecticut watersheds have been reported by the DEC as having poor water quality, thus, are targeted for restoration efforts, especially wetlands. Threats include floodplain alterations, sediment loading, aquatic invasive species, and reduced riparian zones. (Details provided by USEPA Surf your watershed and Vermont DEC Basin Planning for the Watersheds Drained by the Black & Ottauquechee Rivers)

B) Deerfield River: The Deerfield River is one of the most dammed rivers in the US. However, it has remained nearly 78% forested. The 424,960 acre watershed encompasses 16 Vermont towns, 12 tributary rivers, with headwaters in the Green Mountains, VT. The numerous dams along the river restrict anadromous fish movement. The Deerfield River has several conservation priorities, which include invasive plant management of Japanese knotweed (*Polygonum cuspidatum*), open space planning, flow management for multiple uses, protection and improvement of water quality, restoration of contiguous habitat, and protection of critical wetland types. A comprehensive plan issued by the Commonwealth of Massachusetts entitled “Deerfield River Watershed, a 5-year watershed plan” provides detailed summary of an action plan and goals for the waterway.

C) Headwaters: The headwater segment runs 80 miles from the Connecticut River’s source in Maidstone, VT. The headwaters are considered to be in good water quality. The area is important to native trout and the reintroduced Atlantic salmon. Soils of the headwaters are some of the most fertile in Vermont,

especially in the floodplain. Bank erosion, sedimentation, decreased aquatic habitats, and discharge from land-use practices are current threats to the system. Current management targets balancing compatible use with minimal impacts, reducing forestry and agricultural impacts, increasing wildlife biodiversity, and protecting critical wetland systems.

D) Nulhegan River and Paul Stream (Upper Connecticut): The Nulhegan is located only a few miles south of the Canadian border. The watershed was historically a spawning and nursery area for Atlantic salmon (*Salmo salar*). The watershed is predominantly forested, interspersed with streams, and various wetlands, such as beaver flows, bogs, and peat lands. The basin's forests are dominated by northern hardwoods, such as sugar and red maples (*Acer saccharum and rubrum*), beech (*Fagus grandifolia*), and yellow birch (*Betula alleghaniensis*). Several rare plants can also be found in the basin, such as bog sedge (*Carex exilis*) and dropping bluegrass (*Poa saltuensis spp. Saltuensis*). Numerous wildlife species are also found through this area and include the black-backed woodpecker (*Picoides arcticus*), moose (*Alces alces*), wood turtle (*Glyptemys insculpta*), and numerous other reptile, amphibian, mammal and avian species. Current management guidelines focus on reducing habitat loss, maintaining biodiversity, and improving water quality. Current threats include reduced riparian buffers, increased sediment loading, agricultural run off, wetland drainage, and invasive species. (*Details about the watershed were adapted from "The Connecticut River Corridor Management Plan" issued by the Vermont Connecticut River Watershed Advisory Commission*)

E) Ompompanoosuc, Stevens, Waits, and Wells Rivers: The Stevens is a 15 mile mill stream. The source of the Wells River is at Kettle Pond and it is generally a rapid moving stream. The Waits is about 20 miles long and is also an excellent stream for mills. Ompompanoosuc is about 425 miles long located in eastern Vermont. All four rivers have been identified as impaired under Vermont's Clean Water Act and by the EPA and are targeted for restoration and monitoring. The watershed is often referred to as "Little Rivers". Historically, the watershed was dominated by forests, and currently the area is still dominated by forests (88%), with some urbanization. Current management plans are directed at maintaining existing use, salmon spawning locations, identifying reference sites for management guidelines, storm water management, riparian management, and maintaining and enhancing water quality. (*Details found on USEPA Surf Your Watershed and Vermont DEC Specific Basins & Planning Activities*).

F) Passumpsic River: The River originates in East Haven, VT, and runs 23 miles. The River includes several drainage basins, such as Millers Run, Joes Brook, the Water Andric, Moose and Sleepers Rivers. There are several dams along the river that are important for hydroelectric power. The watershed is largely forested (77%), with some agriculture (10.4%). Wetlands total about 11,000 acres, with more than 10 northern white cedar swamps that often contain rare and threatened plant and wildlife species. There are several protected areas, such as 4 WMA, 4 state forests, and a state park. Currently, mercury, flow alterations, sedimentation,

water diversion, pH levels, and phosphorous affect the greatest number of watershed acres. The watershed is critical to fish populations. Management and restoration efforts are prioritized by following Vermont's Water Quality Division's guidelines to meet Vermont's Water Quality Standards and enhancing existing wetland and buffer habitats through management and enhancement. (*Details from Vermont DEC Specific Basins & Planning Activities and USEPA Surf Your Watershed*)

G) Retreat Meadows: The watershed of Retreat Meadows is located in Brattleboro and is a 55 acre area of the backwater of the West River. The Fish and Wildlife Service has listed Meadows as a special focus area to be targeted for protection. Protected areas should include floodplain meadows, wetlands, and forested riparian zones. There are also a number of rare and endangered species that use this habitat (Table 1). Current protection plans focus on, (1) land use regulations, (2) farmland preservation, (3) natural resource conservation, and (4) historical areas. Currently, restoration projects are focused on control of invasive aquatic species such as the Eurasian Water Milfoil and enhancing rare natural communities such floodplain forests and hardwood swamps.

H) Saxtons, West, and Williams Rivers: (*adapted from Vermont's Agency of Natural Resources "Basin 11 management plan, 2008"*). The three rivers are in southeast Vermont and drain along the eastern slopes of the Green Mountains. The three watershed basins cover 395,520 acres. There are five environmental concerns in the basin, which include changing water temperatures, sedimentation, habitat alterations, flow alterations, and pathogens. The waterway supports brook trout and Atlantic salmon populations. Land use is dominated by forests, agriculture, and urbanization. The watershed also has ~7000 acres classified as protected lands. Currently, water quality threats (often related to human activities, such as, recreation and farming), and other issues among the three Rivers are being addressed in a comprehensive management plan issued by Vermont's Agency of Natural Resources which addresses nutrient loading, pollutants, and invasive species. The plan offers recommendations and management guidelines for collaborating agencies.

I) White River: The River's watershed encompasses 455,680 acres. The River is known as Vermont's last free-flowing river, and is critical to the American Salmon Program for juveniles and spawning adults. The Watershed is dominated by forest (~84%), agriculture and small towns. The river is also used heavily for recreation such as fishing, boating, and swimming. However, it also supports critical wetland habitats. The Vermont Agency of Natural Resources has reported that 70% of the river is considered to have good water quality, but 23% is threatened by pollutants, channelization, agricultural runoff, and stream bank erosion. Historical wetland drainage, channelization, and urbanization have significantly altered the riparian zones and current restoration projects focus on improving water quality, repairing riparian zones, and enhancing and protecting wetland habitats. (*Details from*

USEPA Surf Your Watershed and Vermont DEC Specific Basins & Planning Activities).

SERVICE AREA 2: St. Francois River Watershed (HUC 011100; aka Lake Memphremagog Watershed).

The St. Francois Watershed is primarily a drainage basin for Lake Memphremagog (Figure 5). Lake Memphremagog has four tributaries (Barton, Black, Clyde and John's River), and $\frac{3}{4}$ drain into Vermont (463.2 miles squared). The lake is located in both southern Quebec and Northern Vermont. St. Francois watershed has two international basins, the Tomifobia and Coaticook Rivers. There are over 90 inventoried lakes and wetlands (17,660 acres), 64 of which are actively monitored by Vermont's DEC. The majority of the watershed is located in Orleans and Essex Counties. The region is classified as hilly with rich soil from calcareous bedrock and is dominated by hardwood forests.

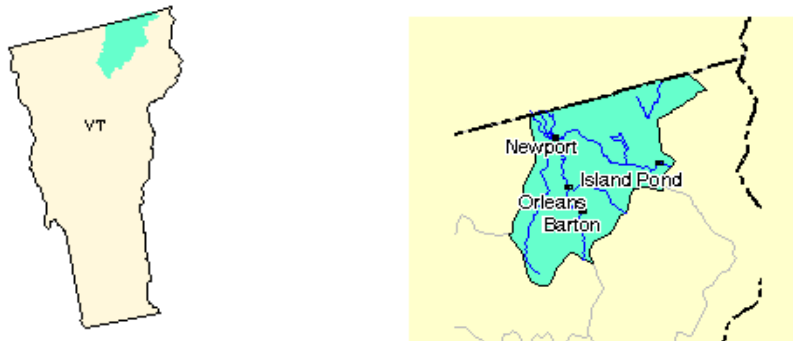


Figure 5. Map St. Francois River Watershed and its associated drainage rivers (maps from USEPA "Surf Your Watershed").

Both Native Americans and European settlers used the watershed as a means of transportation. Numerous mills and logging operations emptied waste material into the waterway, but some of the most significant alterations to the River were a result of channelization and wetland drainage (i.e., Barton River's Runaway Pond). The watershed is currently composed of agricultural and forest lands with increasing residential development. The watershed is a valued resource for recreation, drinking water, and aquatic habitats and it faces several threats to water quality. All river basins in the St. Francois have common threats, such as, nutrient enrichment, aquatic nuisance species [Eurasian Watermilfoil (*Myriophyllum spicatum*)], threats to fish and wildlife as a result of habitat degradation, and shoreline management. The NorthWoods Stewardship Center has been working in the Memphremagog watershed and has reported the area is healthy and stable, but they also report that the area still contains elevated levels of phosphorous and sediments. In particular, water quality was poorest in the John's River which contained extremely high levels of phosphorous, nitrogen, and sediments (Gerhardt 2009).

The DEC has identified the primary land use and cover associated with the Lake Memphremagog watershed as (1) forestry 247,662.3 acres; (2) agriculture 56,363.6 acres; (3) surface water, 29,131.6 acres; (4) wetlands 21,614.5; (5) transportation 15,984.0 acres; (6) developed lands 5,017.9 acres; and (7) old fields 1,231.2 acres. A large portion of the watershed is comprised of forests and wetlands, and urbanization is reduced compared to other Vermont watersheds.

Goals for the Lake Memphremagog Watershed: (Adapted from Department of Environmental Conservation River Management program, Vermont Natural Heritage Program and Vermont Wildlife Action Plan, and The Vermont Nature Conservancy; **Bold** bullets represent goals for the Lake Memphremagog Watershed that will be assisted by the **DU-VT ILF Program**).

- 1) Promote the ecological awareness of people who occupy the watershed.
- 2) Inform and educate the public and promote participation in the preservation of the watershed environment.
- 3) Work with lake associations, local, state, and federal governments, and business to develop policies that protect and improve the watershed.
- 4) Participate in monitoring programs of the lake and its tributaries, clean up and re-naturalize the shoreline and river banks, and protect plants and wildlife.
- 5) Assess treatment to protect and improve water quality.
- 6) Exotic species control and prevention
- 7) Inventory, manage, and conserve Vermont's nongame wildlife (vertebrates and invertebrates), native plants, and natural communities**
- 8) Wetland restoration to provide benefits to migratory wetland birds**
- 9) Invasive species control**
- 10) Natural community restoration**
- 11) Early-succession habitat management and restoration**
- 12) Fish Passage and dam removal
- 13) Manage and re-vegetate riparian buffers**
- 14) Ensure conservation program focus on freshwater priorities in natural areas**
- 15) Integrate rare natural communities onto the landscape with emphasis on floodplain forests, hardwood swamps, and clay plain forests**
- 16) Prevent the loss of existing habitat by developing management plans, acquire easements on high priority areas**
- 17) Riparian habitat to provide critical areas for migrating songbirds and buffer areas for healthy river systems**
- 18) Restore and enhance wetlands to provide benefits to migratory waterfowl and other wetlands birds**

A concern for the Lake Memphremagog Watershed is that water quality may be declining. In Vermont, most water quality issues (i.e., high phosphorous and nutrient loads) originate from soil, wastewaters, and agricultural runoff. Results from Gerhardt (2009) indicated that mean phosphorous levels exceeded the 35 µg/l recommended level (i.e., range 8-575 µg/l) and mean nitrogen was also high (i.e., > 2 mg/l) with a strong relationship with total acres of corn ($R^2 = 0.98$;

Gerhardt 2009). Since the 1970s, significant efforts have been made to reduce the polluting effects of direct discharges into the lake and its tributaries, and lake quality has improved. Now, more attention needs to be focused on addressing nonpoint sources of pollution.

Current Threats:

- 1) Nutrient enrichment
- 2) Wetland loss
- 3) Invasive and/or non-native species
- 4) Loss and destruction of riparian zones
- 5) Global climate change (water temperature extremes)
- 6) Recreational use
- 7) Contaminant load through Water pollution (e.g., storm water runoff)
- 8) Watershed development
- 9) Dams and water flow alterations
- 10) Overfishing
- 11) Shoreline and floodplain development
- 12) Waste water discharge
- 13) Logging
- 14) Floodplain encroachment
- 15) Sedimentation

Priority Conservation within the St Francois Service Area:

The NorthWood Stewardship Center began assessment work to develop restoration and protection projects by working with landowners in the Lake Memphremagog watershed and associated tributaries. Work with federal habitat conservation programs (e.g., CRP, EQIP) should also assist with improving habitat and water quality. Six conservation areas were identified in the St Francois Watershed (Table 2), all of which list waterfowl as a target for conservation activity. The DU-VT ILF Program will directly address the needs of waterfowl, specifically threatened and impacted habitat, as waterfowl are a wetland dependent species.

Table 2. Conservation Areas for St. Francois Service Area.

Location	Area (acres)	Targets	Endangered/ rare species found in area
Barton River	10,9962	Waterbirds, Waterfowl, Contiguous habitat	Black Tern, Common Moorhen, American bittern
Black River	86,240	Waterbirds, Waterfowl, Contiguous habitat	Black Tern, Common Moorhen, American bittern

Clyde River	92,170	Waterbirds, Waterfowl, Contiguous habitat	Black Tern, Common Moorhen, American bittern
Coaticook River	1,900	Waterbirds, Waterfowl, Contiguous habitat	Black Tern, Common Moorhen, American bittern
John's River	7,166	Waterbirds, Waterfowl, Contiguous habitat	Black Tern, Common Moorhen, American bittern
Tomifobia River	10,240	Waterbirds, Waterfowl, Contiguous habitat	Black Tern, Common Moorhen, American bittern

Bold font represents watershed conservation targets that will directly benefit from the **DU-VT ILF Program**.

Conservation Areas (Adapted from NorthWoods Stewardship Center "Lake Memphremagog Assessment Report and Vermont DEC, Water Quality Division, Specific Basins & Planning Activities):

A) Barton River: The Barton River watershed covers 109,962 acres and flows into the southern end of Lake Memphremagog. The watershed includes one large river, Willoughby, and several large lakes (Lake Willoughby and Clear Lake). Land use around the watershed is primarily agriculture, thus, common threats include elevated levels of sediments and nutrient loads. Similarly, there are several invasive aquatic species, such as, purple loosestrife (*Lythrum salicaria*) and common reed (*Phragmites australis*). There are numerous wetlands throughout the watershed (e.g., Low Barton River Swamp, Cobb Brook Cedar Swamp, Willoughby River Swamp, and Stillwater). The swamps are dominated with red maple, white cedar, and black ash. Currently there are several water quality stress factors in the watershed. Thus the State of Vermont has identified the Barton River as high priority for assessment and restoration. Restoration often addresses restoring and protecting wetlands and upland habitats, with emphasis on floodplain forests and hardwood swamps.

B) Black River: Black River is a tributary of Lake Memphremagog located in Northern Vermont. The river runs over 30 miles, and contains no dam sites. Within the watershed there are over 600 acres of lakes and ponds with the three largest being Elligo, Little Hosmer, and Great Hosmer Pond. The watershed's largest tributary is Lord's Creek. Current threats to the system include: (1) evaluated mercury levels in fish; (2) high sediment levels; (3) water level fluctuations that affect aquatic habitats; and (4) invasive species. Thus, the area has also been identified by the DEC as high priority for monitoring programs and riverine and wetland restoration. (*Details provided by DEC's Basin 17 watershed assessment*).

C) Clyde River: The river drains 92,170 acres and its mouth is located in Newport. There are several large tributaries (Pherrins and Seymour River), lakes (Lake Seymour, Salem, and Island Pond), wetlands, and ponds. The watershed consists of extensive forested, shrub-scrub, and emergent wetlands. The floodplain contains numerous tree species such as, black ash (*Fraxinus nigra*), northern white cedar (*Thuja occidentalis*), red maple, and yellow birch (*Betula alleghaniensis*). The DEC has identified this watershed as a priority area because of (1) elevated sediment levels, (2) elevated mercury, (3), altered flow regimes, and (4) invasion of exotic species.

D) Coaticook River: The Coaticook flows for about 6 miles before entering Canada. The River has 7 tributaries that include Station, Sutton, Davis, Gaudette, Moster Meadow, Number 5, and Number Brooks. Several cedar swamps and wetlands are located in the watershed. Cedar swamps in the Bill Sladyk WMA are estimated to be over 140 years old, making them the most mature swamps in the state. Currently logging, water level manipulation, and altered aquatic habitat are the main threats to the system and are the primary targets for restoration efforts (Detail provided by DEC, water quality division, Basin Planning).

E) John's River: The John's River drains 7,166 acres and flows into Lake Memphremagog south of the Canadian border. The river has three tributaries, but no lakes or ponds. The John's River does contain several wetland communities with scattered populations of pygmy water lily (*Nymphaea leibergii*; the first populations found in the state). Other wetland communities include shrub-scrub, riverine floodplains, and red maple and northern white cedar swamps. The River has been identified by DEC as high priority because of the following threats: (1) elevated levels of sediment, (2) elevated nutrients, and (3) invasive aquatic species.

F) Tomifobia River: The 10,240 acre watershed has the majority of its tributaries in Canada with the exception of Holland and Stearns Brook. There are four large wetlands including, Holland, Turtle, Round, and Beaver Ponds that contain northern white cedar swamps, bogs, and beaver ponds. The watershed has been identified as being in good condition by DEC, but several areas are still listed as impaired and priority areas include the above-mentioned wetlands. Threats include: low nutrients, increased acidification, bank erosion, and increased sediments.

SERVICE AREA 3: Upper Hudson River Watershed (HUC 020200).

The Hudson River Watershed encompasses 13,300 mi² in parts of New York, Vermont, Massachusetts, Connecticut, and New Jersey where more than 60% of the basin is forested (Figure 6). Nearly 3% of the Hudson watershed is in Vermont and is located in the southwestern corner. There are three main tributaries within

the Vermont watershed, Battenkill, Walloomsac, and Hoosic Rivers. The watershed continues to be an important area for recreation, commercial use and ecological services. During European settlement, the Hudson River was an important transportation route between northern and southern colonies. The watershed is currently being affected by failed onsite water systems, waste materials, and stream-bank erosion. Currently, there are 8 water bodies that are listed as impaired by Vermont Agency of Natural Resources, and several of the locations are near the Hoosic River watershed and Branch Pond.

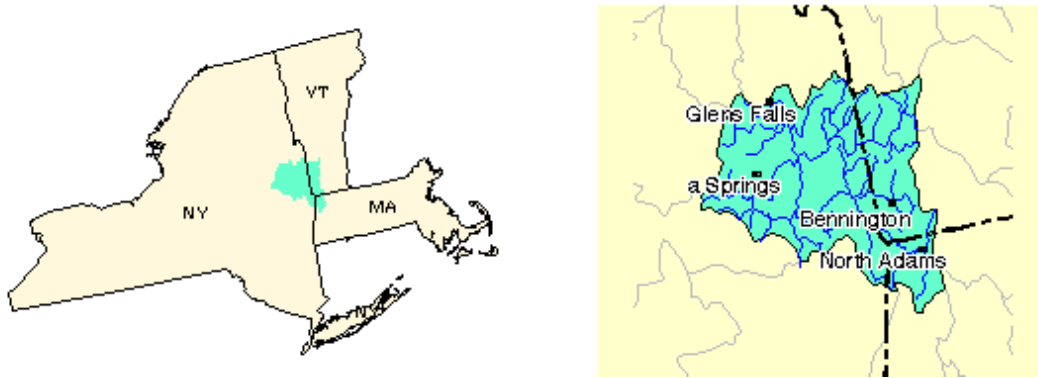


Figure 6: Upper Hudson River Watershed (map from EPA “Surf Your Watershed”)

The Upper Hudson watershed is composed of numerous habitats that are important to a variety of wildlife and ecological services (i.e., riparian zones, buffers, swamps, and tributaries). There are several unique habitat types that are priority for conservation, they include, (1) near shore shallow and vegetative areas that provide refuge for fish, mammals, reptiles etc.; (2) deltas formed by tributaries that provide spawning and feeding areas for fish; (3) riparian forests that provide roosting and breeding habitat for birds; (4) riparian wetlands which are especially sensitive areas that provide an link between aquatic and terrestrial systems; and (5) riparian zones which usually have high species richness, and play a key role in nutrient cycling. The watershed is home to over 2,000 plant and animal species, including the federally listed Indiana bat (*Myotis sodalists*). A cooperative Water Quality Report with New York and Vermont State Department of Environmental Conservation has listed the Hudson Watershed in good condition (Figure 7). However, there are three water quality concerns, (1) PCB discharge from industry, (2) atmospheric deposition of mercury, and (3) acid rain.

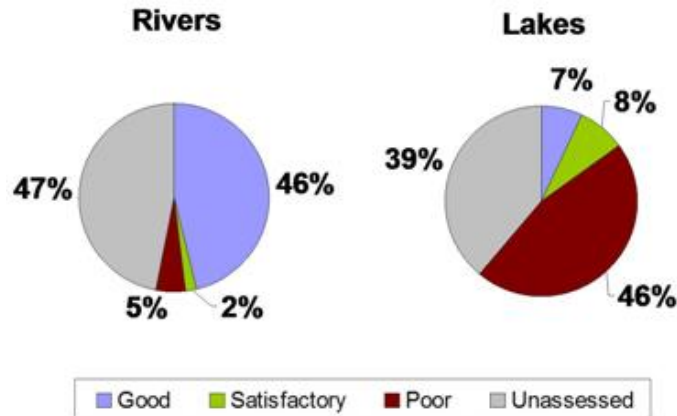


Figure 7. Summary of Hudson Watershed Water Quality as reported by NYDEC (2010). **Purple** is Good: Fully supports designated activities and uses, **Green** is Satisfactory: Fully supports designated activities, but with minor impacts, **Red** is Poor (Impaired): does not support designated activities and uses, and **Grey** is Unassessed: Insufficient data available (NYDEC 2010).

Goals for the Hudson River Watershed: (Adapted from Hudson River Watershed Alliance, Strategic Plan, *Vermont Natural Heritage Program and Vermont Wildlife Action Plan*, and *The Vermont Nature Conservancy*; **Bold** bullets represent goals for the Hudson Watershed that will be assisted by the **DU-VT ILF Program**).

Overall goal is to provide protection, enhancement, and restoration of the basin by focusing on:

- 1) Water quality and quantity
- 2) Public health and safety
- 3) Scientific information
- 4) Sustainable land use practices
- 5) Fish and wildlife conservation**
- 6) Exotic species control and prevention**
- 7) Inventory, manage, and conserve Vermont's nongame wildlife (vertebrates and invertebrates), native plants, and natural communities**
- 8) Wetland restoration**
- 9) Invasive species control**
- 10) Natural community restoration**
- 11) Early-succession habitat management and restoration**
- 12) Fish Passage and dam removal
- 13) Manage, re-vegetate riparian buffers**
- 14) Ensure conservation program focus on freshwater priorities in natural areas**
- 15) Restore and enhance wetlands to provide benefits to migratory waterfowl and other wetlands birds.**
- 16) Prevent the loss of existing habitat by developing management plans, acquire easements on high priority areas, and their ensure protection of ground water recharge areas**

17) River, Lake Shorelines and floodplain forests- prioritize for conservation existing continuous riparian corridors and associated wildlife habitat by improving stream flow and floodplain forests, and maintain/restore critical habitat for fish and wildlife

Current Threats:

- 1) Nutrient enrichment
- 2) Wetland loss
- 3) Invasive and/or non-native species
- 4) Loss and destruction of riparian zones
- 5) Global climate change (water temperature extremes)
- 6) Recreational use
- 7) Contaminant loading (i.e., metals) by Water pollution (e.g., storm run off)
- 8) Watershed development
- 9) Dams and water flow alterations
- 10) Overfishing
- 11) Shoreline and floodplain development
- 12) Waste water discharge
- 13) Logging
- 14) Floodplain encroachment
- 15) Thermal modifications
- 16) Acidification

Additional Watershed goals focus on Wetlands, Streams, Floodplain forests, Upland shores,

Table 3. Pollutant causes and other treats to the Hudson River Watershed (From Vermont’s Agency of Natural Resources 2002).

Cause or pollutant	Miles of high impact	Miles with moderate impact	Total miles of impact	Miles threatened
Nutrients	0	8.0	8.0	12.2
Pathogens	1.0	7.0	8.0	0
Metals	0.2	7.0	7.2	0.3
pH	4.5	2.0	6.5	9.0
Habitat alterations	0	1.8	1.8	28.6
Sedimentation	0	0.3	0.3	34.7
Thermal modification	0	0	0	20.0

Conservation Areas within the Hudson River Service Area:

The Vermont Agency of Natural Resources recommends assessment of rivers, streams, and lakes require identification of areas where important use and values

of the water has been compromised by poor water quality and/or significant alterations to the system and require identification of specific causes and sources associated with the systems problems and threats. The assessment and monitoring will also be used to identify habitat and water quality that is in good condition. All three conservation areas within the Hudson River Service area (Table 4) have aquatic habitats, via plants or animals, as conservation targets, therefore the DU-VT ILF Program will address the needs of these conservation targets via wetland restoration and protection.

Table 4. Conservation Areas within the Hudson River Service Area.

Location	Area (acres)	Targets	Endangered/ rare species found in area
Battenkill River	288,000	Fisheries Waterbirds Aquatic habitat and associated upland buffers	<i>Potamogeton confervoids</i> , Bladderwort, Indiana Bat
Walloomsuc River	88,960	Aquatic plants, Contiguous habitat	<i>Littorella Americana</i> , Indiana Bat
Hoosic River	16,000	Waterbirds, Contiguous habitat	Indiana Bat

Bold font represents watershed conservation targets that will directly benefit from the **DU-VT ILF Program**.

Conservation Areas: (Adapted from Vermont's Agency of Natural Resource Basin 1 Watershed Management Plan, and Vermont DEC, Water Quality Division, Specific Basins & Planning Activities)

A) Battenkill River: The river originates in the Green Mountains and runs 55 miles. Over half of the river and its tributaries have undergone channelization and flood control as a result of deforestation, mill construction (i.e., dams), agriculture, and road construction. Thus, there has been a loss of deep pools, loss of aquatic habitat for fish, eroded stream banks, and restriction of floodplains. The watershed is dominated by forests and only a small portion <4% is in urban use. It supports brown trout (*Salvelinus fontinalis*), and numerous other wildlife species including several rare and endangered species. Current objectives of the watershed supports corridor protection to minimize human impacts and erosion, management of the river and its tributaries to balance human use and river biodiversity, restoration of floodplain forests and riparian zones.

B) Walloonmsuc River: The watershed drains most of Bennington County. A current area of concern is the riverine forest which is one of the few remaining floodplain forests left in southwestern Vermont. The watershed is primarily forested with some agriculture. Wetlands account for 3% of the total area, and

there are 6 lakes that cover 193 acres. Current threats include nutrient loading, pathogens, habitat alterations, sedimentation, and thermal alterations. There are several basins that are listed as impaired by Vermont's List of Impaired Surface Waters. Restoration efforts should focus on improving habitat and water quality.

C) Hoosic River: The River flows through the corner of Vermont and runs 11 miles. Its principal tributary is Roaring Brook. Over 77% of the area is forested and agriculture accounts for 11% of the land use. There are several areas of critical forested rivers and floodplain forests located within the watershed. The dominant forest species are sugar-maples and basswoods (*Tilia americana*). The Hoosic is an important area for conservation. Most of the watershed has been reported to be in good condition, but there are still areas of concern. Nutrients and pathogens are the primary cause of water quality issues within the basin. Sedimentation, loss of riparian areas, invasive species, and habitat alterations have been reported to be problems for fish spawning and nurseries, and other aquatic wildlife. Current protection for the watershed supports decreased stream bank erosion, minimization of human impacts, management of the river and its tributaries to balance human use, restoration/maintenance of river and wetland biodiversity, and restoration of floodplains and riparian zones.

SERVICE AREA 4: *Richelieu River Watershed*

The Lake Champlain watershed is about 5,269,760 acres, covering New York, Vermont and Quebec (Figure 8). The narrow northern part of the lake empties into the Richelieu River where it flows into the St. Lawrence. There are 11 main tributaries that drain into the lake and range in size from 20-102 miles long. The watershed is located on the western side of Vermont, extends from the Green Mountains, and encompasses 56% of Vermont. Prior to roads and railroads, the lake was used heavily for boat transportation. The watershed is home to a diversity of fish, birds, mammals, and amphibians, and also supports a diversity of habitats, such as deep cold waters to shallow bay lakes, wetlands, mixed deciduous forests, and alpine peaks. Currently, the area is important to Vermont's dairy industry and is also used for numerous recreational purposes, such as fishing, boating, and swimming. The land cover is dominated by forests (62%), agriculture (28%), and water (7%). The land use and land cover in the watershed varies from alpine meadow to lakeside floodplain forests. Much of the landscape has been altered by human activities and today forests dominate the landscape. Chittenden County, Vermont, is located in the northern half of the watershed, is the most rapidly developing county in Vermont and wetland loss is double compared to other Vermont counties (Morrissey and Sweeney 2006).



Figure 8. Lake Champlain watershed.

The Lake Champlain Watershed goal, as described by the Lake Champlain Basin Program, is to provide assistance with planning, design and implementation of projects that contribute to the protection and enhancement of the watershed. Currently there is a comprehensive watershed management plan that focuses on water quality, fish and wildlife resources, recreation management, and cultural heritage protection. There are several serious environmental problems such as: high phosphorus concentrations, toxic substances, invasive species, water quality degradation, and habitat degradation.

Phosphorous from the surrounding landscape enters the lake through rivers and tributaries. Average phosphorous loads during 2002-2006 from nonpoint sources were 391.0 metric tons/year, which is well above the 166.0 metric tons/year goal (Lake Champlain Basin Program 2008). Point source phosphorous loads, such as industrial discharge, have been sustainably reduced to <10% of the total phosphorus in the lake. Best management practices are in place for forest and agricultural landscapes to reduce phosphorous runoff.

There are seven priority nuisance species in the watershed including, purple loosestrife, water chestnut, Eurasian Watermilfoil, Japanese knotweed, zebra mussels, sea lampreys, and alewife. These nuisance species are causing significant environmental and economic impacts, and have a high potential for expanding their range. Therefore, management is of high priority.

- 1) Purple Loosestrife: has been in the watershed since 1929 and occurs in 117 towns in Vermont. Purple loosestrife competes with native plants and provides unsuitable habitat for native wildlife.
- 2) Eurasian Watermilfoil (*Myriophyllum spicatum*): A 1976 survey indicated that milfoil was present in all parts of the Lake Champlain basin, and new infestations are documented every year.

- 3) Japanese Knotweed (*Polygonum cuspidatum*): Commonly found in rivers and wetlands associated with Lake Champlain and it is of little to no value to wildlife.
- 4) Water chestnut (*Trapa natans*): the water chestnut originated from Europe and was first documented in 1940 within the basin. Dense populations of the plant restrict boat movement and other recreational use. It also has no value to wildlife.
- 5) Sea Lampreys (*Petromyzon marinus*): are a parasitic fish that will kill or weaken native fish species and have been documented as a problem species since the 1970s.
- 6) Zebra Mussels (*Dreissena polymorpha*): a small freshwater mollusk from Eastern Europe. It was first discovered in the lake in 1993. Their rapid growth can have profound effects on fisheries.
- 7) Alewife (*Alosa pseudoharengus*): They are a member of the Herring family and have the potential to displace native smelt.

Goals for Richelieu Watershed: (Adapted from Lake Champlain Basin Program 2009 Vermont Natural Heritage Program and Vermont Wildlife Action Plan, and The Vermont Nature Conservancy; **Bold** bullets represent goals for the Richelieu Watershed that will be assisted by the DU-VT ILF Program).

- 1) **Reduction of phosphorus inputs: to promote a healthy ecosystem and provide sustainable human use.**
- 2) Reduction of toxic contamination: to protect human and ecosystem health
- 3) Minimize the risk to human health from water-related issues
- 4) **Control the introduction non native species through site specific adaptive management**
- 5) Control spread of invasive species
- 6) **Exotic species control and prevention**
- 7) **Inventory, manage, and conserve Vermont's nongame wildlife (vertebrates and invertebrates), native plants, and natural communities**
- 8) **Wetland restoration with focus on priority areas**
- 9) **Natural community restoration**
- 10) **Early-succession habitat management and restoration**
- 11) Fish Passage and dam removal
- 12) **Manage and re-vegetate riparian buffers**
- 13) **Ensure conservation program focus on freshwater priorities in natural areas**
- 14) **River, Lake Shorelines and floodplain forests- prioritize for conservation existing continuous riparian corridors and associated wildlife habitat by improving stream flow and floodplain forests, and maintain/restore critical habitat for fish and wildlife.**
- 15) **Integrate rare natural community restoration into the agricultural landscape with emphasis on floodplain forests, hardwood swamps, and clay plain forests.**

- 16) Restore and protect riparian habitat to provide critical areas for migrating songbirds and buffer areas for healthy river systems
- 17) Ensure long-term protection and restoration of ecological functions

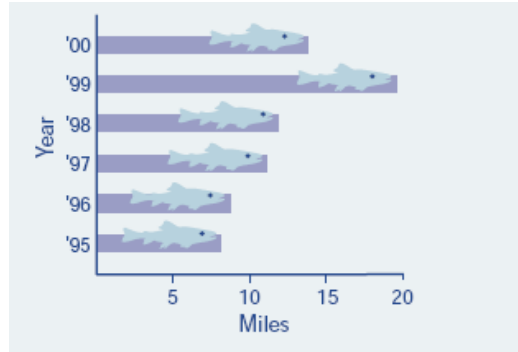


Figure 9: Miles of stream bank restored in the Lake Champlain Basin through USFWS Partners for Fish and Wildlife Programs, 1995-2000 (From the Lake Champlain Basin Program 2003).

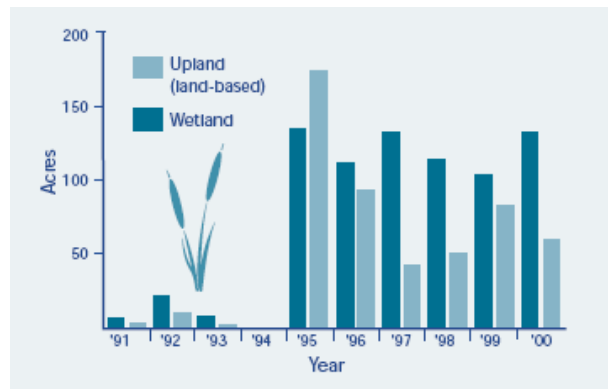


Figure 10: Upland and wetland habitat restoration in the Lake Champlain through USFWS Partners for Fish and Wildlife Programs, 1995-2000 (From the Lake Champlain Basin Program 2003).

Current Threats:

- 1) Nutrient enrichment
- 2) Wetland loss
- 3) Invasive and/or non-native species
- 4) Loss and destruction of riparian zones
- 5) Global climate change (e.g., water temperature extremes)
- 6) Recreational use
- 7) Contaminant loading by water pollution (e.g., storm water run off)
- 8) Watershed development

- 9) Dams and water flow alterations
- 10) Overfishing
- 11) Shoreline and floodplain development
- 12) Waste water discharge
- 13) Logging
- 14) Floodplain encroachment
- 15) Phosphorous loads
- 16) Agricultural run off

Priority Conservation within the Richelieu Service Area:

In the Lake Champlain Basin Wetland Restoration Plan 2007, conservation areas were selected based on hydric soils, slopes $\leq 5\%$, national wetlands inventory data, and size > 3 acres. The result was a preliminary set of potential agricultural and other open areas for wetland restoration (Table 5). Target wetland types for the area are flooded forests, shrub swamps, and shallow emergent marshes. Site selection criterion (see Key 1-1 and Selection Criteria below) will reflect the watershed and Wildlife Action Plan goals and objectives to maximize the restoration benefits at the habitat scale within watershed priority or natural areas.

Table 5. Results from Vermont site selection model which represents areas that could be restored to functional wetlands as identified in Lake Champlain Basin Wetland Restoration Plan 2007.

Subbasin	Area (Acres)	Number of Sites	Area of Sites (Acres)	Percentage of Subbasin
Lake Champlain Canal*	238,210	60	420	0.2%
Lake Champlain Direct*	591,430	2,203	42,720	7.2%
Lamoille River	462,650	376	3,500	0.8%
Missisquoi River*	391,929	785	10,030	2.6%
Otter Creek	604,160	1,081	24,900	4.1%
Winooski River	680,380	378	4,910	0.7%
Total	2,968,750	4,883	86,480	2.9%

*Vermont portion of subbasin only, areas in New York and Canada excluded.

Table 6. Conservation Areas for Richelieu Service Area.

Location	Area (acres)	Targets	Endangered/ rare species found in area
Poultney/Mettawee River	876,153	Fish, wildlife, riparian zones, aquatic habitats and associated upland buffers	Indiana Bat

Otter Creek	606,560	Waterfowl, waterbirds, water quality	Indiana bat, bald eagle
Little Otter Creek	46,720	Waterfowl, waterbirds, water quality	Indiana bat, bald eagle, rails, common moorehens
Lewis Creek	52,000	Erosion, bank stabilization, waterbirds	Indiana bat, bald eagle
LaPlatte	36,740	Erosion, bank stabilization, waterbirds	Bald eagle, Indiana Bat
Malletts Bay	23	Erosion, bank stabilization, waterbirds	Bald eagle, Indiana Bat
St. Albans Bay	32,162	Erosion, bank stabilization, waterbirds	Bald eagle, Indiana Bat
Missisquoi, Rock and Pike River	767,312	Waterbirds, fisheries, Aquatic plants, Contiguous habitat	Bald eagle
Lamoille	556,578	Waterbirds, fisheries, Aquatic plants, Contiguous habitat	
Winooski	690,000	Bank stabilization, waterbirds, fisheries	Bald eagle, Indiana Bat

Bold font represents watershed conservation targets that will directly benefit from the **DU-VT ILF Program**.

Conservation Areas: (Adapted from Vermont DEC, Water Quality Division, Specific Basin and Planning activities, unless otherwise stated):

A) Poultney/Mettawee River (adapted from Poultney/Mettawee Basin Plan): The Poultney River originates in the town of Tinmouth, VT. There are 25 lakes and ponds that are greater than 20 acres. The watershed is 876,153 acres and is 40 miles long. The watershed consists of numerous communities such as: floodplain forests, northern hardwood forests, oak-hickory forests, emergent marsh, hardwood-cedar swamps, and shrub swamps. Over 55% of Vermont's fish species can be found in this watershed. The area was once heavily forested (69%) with numerous wetlands, but currently forested land makes up a small portion of the valley. Thus, efforts today focus on restoring the forest floodplain (i.e., Champlain Clayplain Valley Forest Restoration Plan). Current projects within the basin focus on water quality monitoring, stocking native plants, landowner outreach programs, detailed geomorphic assessments, nutrient management, and repair to riparian buffers. The VT-DU ILF Program will assist with targeting and enhancing critical wetland habitat and associate upland buffers.

B) Otter Creek, Little Otter Creek, and Lewis Creek (*adapted from Addison County River Watch Collaborative, Little Otter Creek water quality report 2009, and Vermont DEC Specific Basins & Planning Activities*): The Otter Creek Watershed has the most restoration opportunities for priority sites (i.e., palustrine forested wetlands, scrub shrub, emergent marsh, and riparian buffer establishment). Past manipulations of the waterways were for harnessing power, transportation, and irrigation. Currently the watershed is used for recreation, hydropower, and is heavily farmed. Primary land usage surrounding the river is agriculture (56%), forest (35%), and urban (4%). This area has been listed by the State of Vermont as impaired. Current projects include; water quality monitoring, enhancement for wildlife, erosion intervention, developing a water quality monitoring program, reducing storm water contaminants, reducing sedimentation, and conserving and protecting fisheries and wildlife.

D) Lower and Upper Lake Champlain, LaPlatte River, Malletts Bay, St. Albans Bay, Rock River: Lake Champlain is a long slender lake that runs over 100 miles between the Green Mountains, Vermont and the Adirondacks, New York. LaPlatte drains into Shelburne Bay, VT. The dominant land type is forest (61%), and the remainder is agriculture and urban areas. The area currently fails to meet water quality standards for phosphorous, primarily because of excess non-point source loads, such as pollutants from stream banks, degraded riparian zones, and agricultural activities. Watershed goals for the area include establishing a quantitative assessment of management practices focused on improving riparian zones for reducing nutrient loads, bacteria, and sediments, and providing critical areas for migrating songbirds and wetland wildlife.

E) Missisquoi, and Pike Rivers (*adapted from Vermont DEC Missisquoi River watershed water quality and aquatic habitat assessment report 2004*): The basin drains from northwest Vermont into southern Quebec, but 60% of the drainage basin is in Vermont. Forestry (66%) and agriculture (19%) are the dominant land cover and use. The Missisquoi accounts for over one-third of all the non-point source phosphorus in Lake Champlain. Phosphorus runoff from eroding stream banks and a lack of buffers on worked fields promotes excessive algae growth and impairs water quality. Dairy is the predominant agricultural operation in the Missisquoi watershed where farmlands make up approximately 39% of the watershed. Conservation is directed at reducing phosphorus loads which include wastewater treatment plant upgrades, stabilization of stream banks and stream channels, better storm water management, erosion control on developed land and roadways, and integrate rare natural community restoration into the agricultural landscape with emphasis on floodplain forests, hardwood swamps, and clay plain forests.

F) Lamoille (*adapted from Lamoille River Basin water quality management plan*): The Lamoille Basin includes the Upper, Lower and North Branches of the Lamoille River, Lee River, Browns River, and the shoreline areas from Malletts Bay to Hog Island, which runs 85 miles. There are 24 lakes and ponds that are over 20 acres

in size. Forests dominate the landscape (71%) and agriculture is the second largest land use encompassing 13% of the total area. Current goals include setting management criteria and guidelines for water quality, stream stabilization, improving stream buffer zones, improving riparian buffer zones, improving wildlife habitat, reducing sedimentation and nutrient loading, and controlling invasive species. Swimming, boating, fishing, and water supply are the dominant human uses of the watershed. The watershed supports numerous fish and wildlife species. Thus, water quality planning for this watershed focuses on multiple use management guidelines for riverine and wetland habitats.

G) Winooski River (*adapted from Vermont DEC Winooski River Basin Planning*). The watershed covers all of Washington County and part of Chittenden County, and is the largest watershed that empties into the Lake Champlain. The Winooski watershed covers an area of 1228 square miles and includes the cities of Burlington, Barre, and Montpelier. There are 764 miles of river of which 760 miles are perennial rivers. More than 75% of the watershed is forested, where wetlands, water bodies, and urbanization make up the remainder of the watershed area. Current threats to the system are a result of agricultural runoff, development, forestry practice, and recreation. Watershed protection and restoration measures include establishing riparian buffers, assisting towns with updates to town plans and zoning, stream bank and gully stabilization, storm water management, road erosion control projects, and agricultural best management practice implementation.

Element VI: Prioritization for selecting and implementing mitigation activities.

Selection Criteria

Mitigation projects will be evaluated for their potential to provide appropriate compensatory mitigation for impacts to aquatic resources in accordance with DU's strategic planning process based on sound science and adaptive management principles. DU will use targeting tools available to identify and prioritize key properties based on ecological and functional values to increase the likelihood of success of mitigation projects. These spatial layering tools (e.g., GIS) will first help evaluate key restoration and/or preservation parameters. For example, ecological and functional parameters for successful restoration include an assessment of soils (hydric), evaluation of slope, determination of sub-watershed size and shape, current and adjacent land use, existing and potential hydrology, historical alterations of the property, landscape proximity to other preserved or restored lands, evaluation of the potential to improve habitat for threatened and endangered species, and evaluation of cultural resources (i.e., Key 1-1 on p.66). Sample data layers for targeting mitigation projects can be found below (Figures A-E).

For land preservation, key parameters include, but are not limited to, surrounding landscape composition, state and federal designation of important lands for

preservation, a highly impacted and/or threatened landscape type, lands important for threatened or endangered species, lands important for water quality or quantity threats, and both willing landowners and landholders (i.e., Key 1-1).

Criteria for site selection will include:

A) Additional success parameters: Threats from invasive species or vandalism should be low or manageable. The project will be evaluated for its ability to result in successful and sustainable net gain of aquatic resource area and/or function.

B) Multiple objectives: Projects will be evaluated based on their potential to address multiple functions and services such as improvement of fish and wildlife habitat, support for rare species, flood attenuation, water quality improvement, and recreation or education values. Projects that can utilize native plant community diversity and natural processes will yield greater functional gains and be given higher preference.

C) Support regional conservation initiatives and is compatible with the surrounding landscape: Projects should be located where they compliment adjacent land uses, meet regional conservation priorities, address limiting factors in watersheds, increase habitat diversity, support state wildlife action plans, reduce fragmentation, establish corridors and enhance the function of existing natural areas.

D) Project costs: Projects with high aquatic resource functional gain per dollar will be given preference.

E) Address water quality issues: Focus on the most degraded areas or most severe water quality issues important for maintaining or improving ecosystem functions.

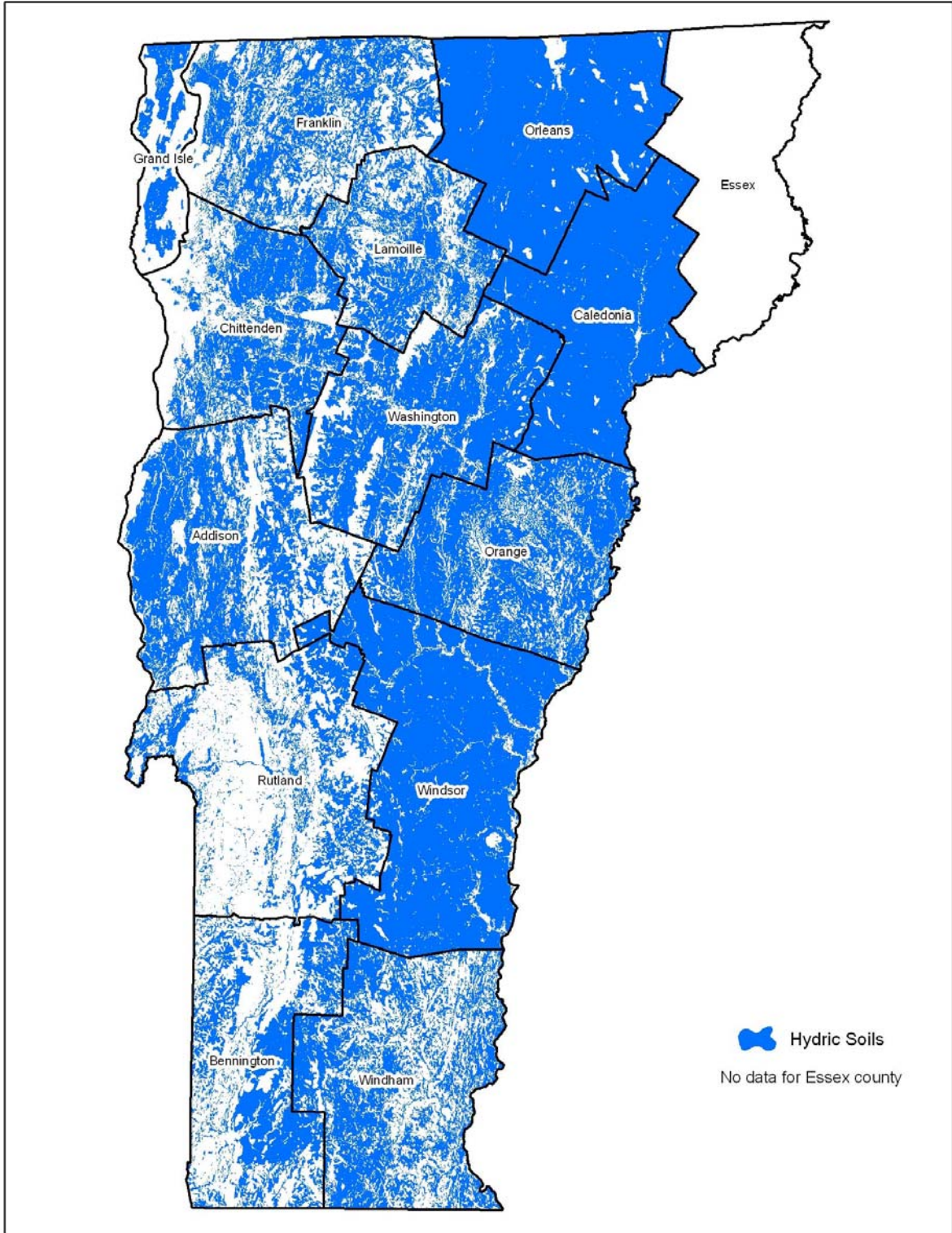


Figure A: GIS layer of hydric soils, Vermont.

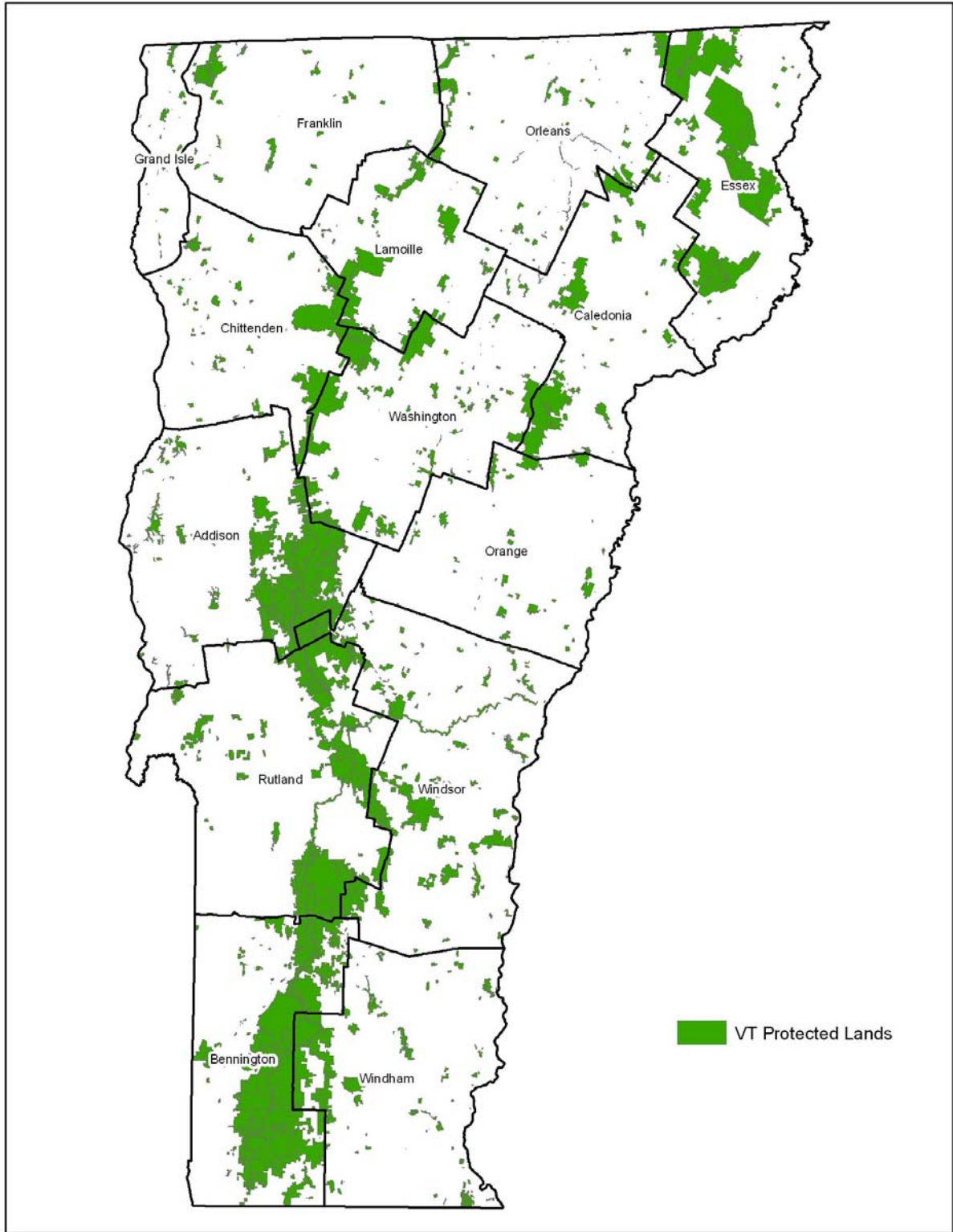


Figure B: GIS layer of total protected lands, Vermont.

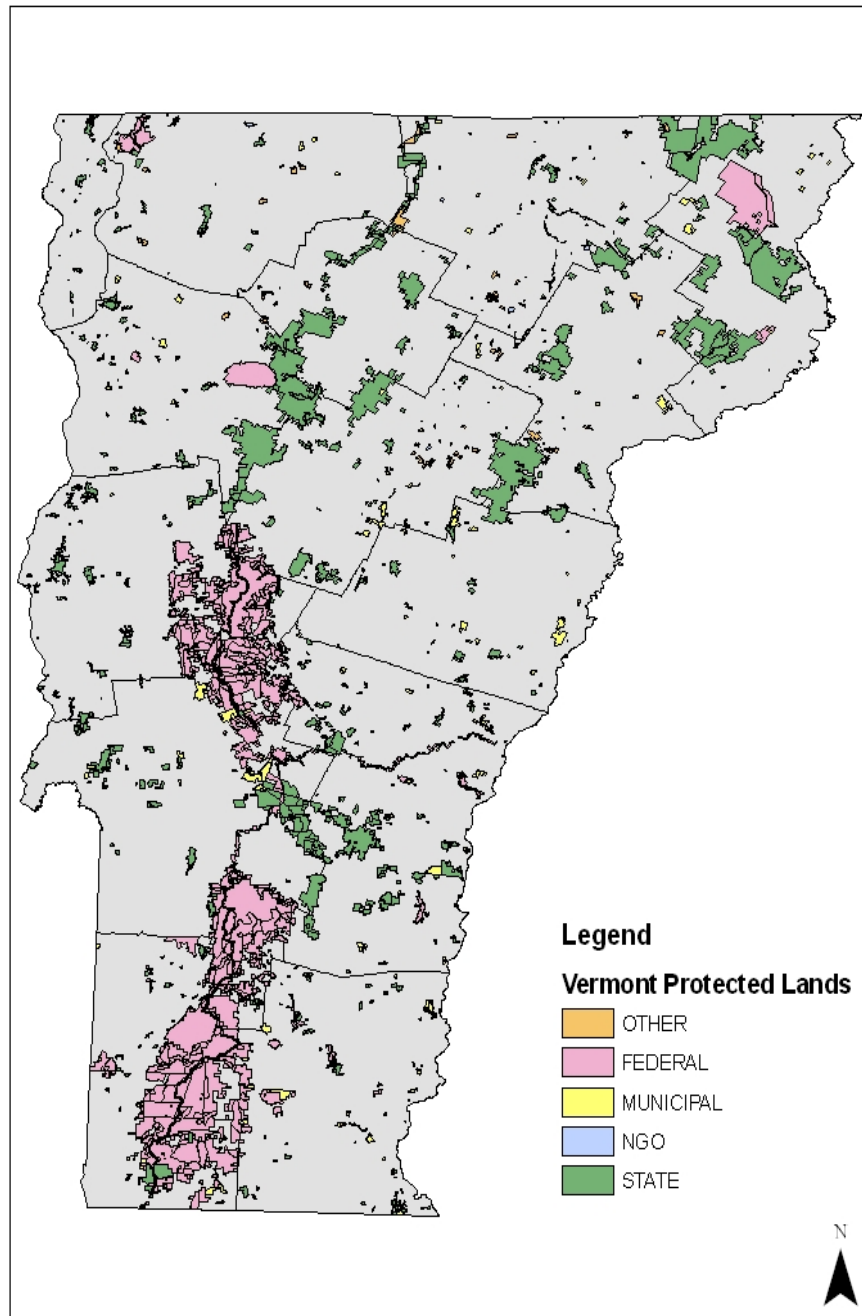


Figure C: GIS data layer of protected lands in Vermont separated by agencies.

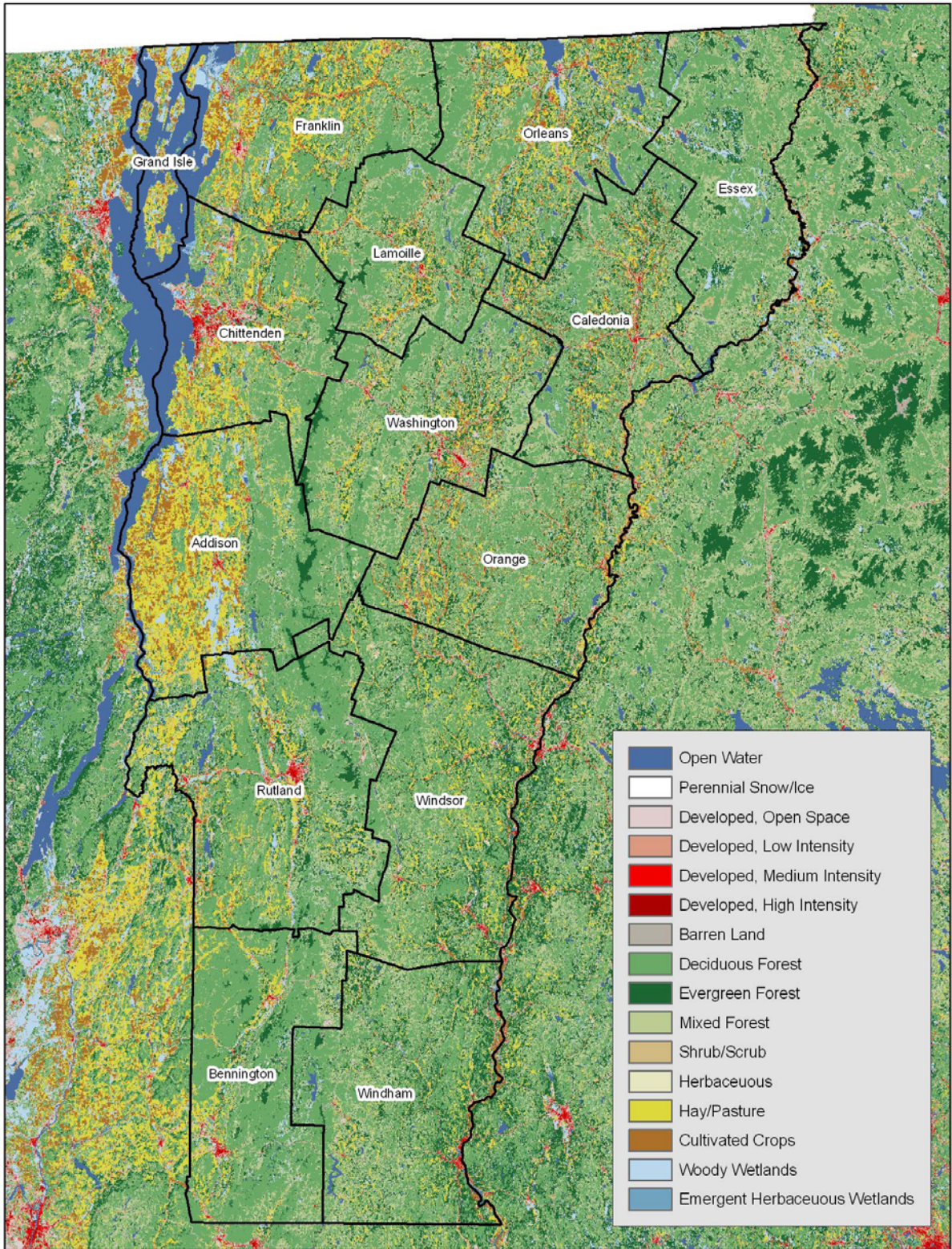


Figure D: GIS layer of landscape features and habitat types, Vermont.

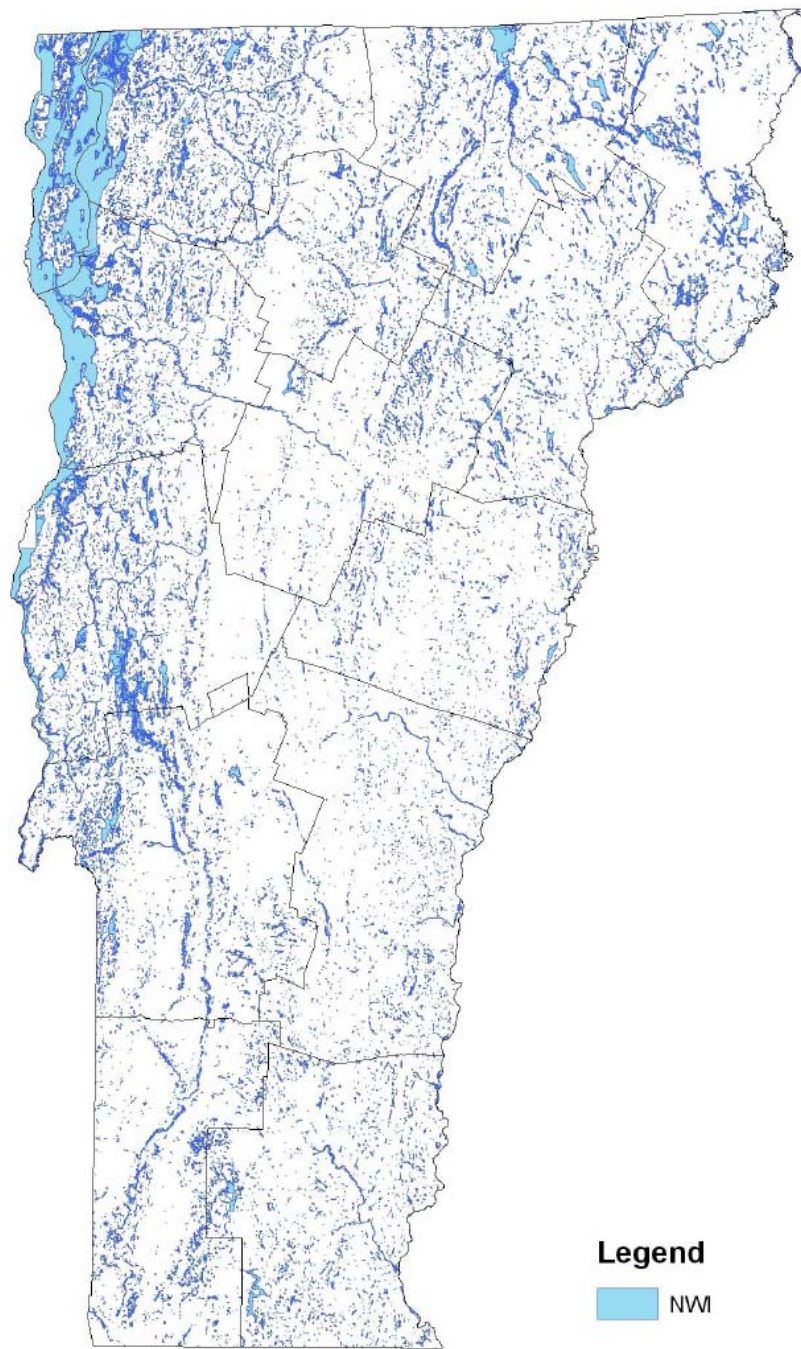


Figure E: GIS layer of National Wetland Inventory (NWI) data for Vermont.



Figure F: The Vermont Natural Conservancy protected natural areas ($n = 54$)

Element VII: Preservation objectives

Preservation objectives will address the watershed approach to maximize the ecological benefits to an ecosystem. Similarly, Vermont's Watershed Initiative recommends that watershed management plans occur every 5 years, where renewed plans will steer a continually evolving course of watershed management and improvement. Preservation will support regional conservation initiatives and will be compatible with the surrounding landscape. Projects will be located where they compliment adjacent land uses, meet regional conservation priorities, address limiting factors in watersheds, increase habitat diversity, support state wildlife action plans, reduce fragmentation, establish corridors and enhance the function of existing natural areas.

The DU-VT ILF Program will use a science based approach to assist with identification and selection of target preservation areas (*sensu* The Vermont Nature Conservancy and the Vermont Wildlife Action Plan priority area selection models). The DU-VT ILF Program will implement conservation efforts at multiple scales (Vermont DEC 2005) by using a watershed approach to target priority areas and associated habitats at the landscape scale. For example, DU may focus on preserving riparian buffers along a stream, floodplain forest, or critical corridors for contiguous habitat.

Preservation actions will be targeted at the habitat level which will correspond with the goals for managing Vermont's Species of Greatest Conservation Need (i.e., Vermont Wildlife Action Plan; Vermont DEC 2005) and reducing current habitat problems. Current threats include, 1) conversion of floodplains, lakeshores, and riparian communities to agriculture; 2) removal or alteration of vegetative communities; 3) interruption of corridors; 4) dams, drainage and ditching that affect flooding, and erosion; 5) habitat alteration from invasive species; and 6) increased human activities disturbing wildlife activities (Vermont DEC 2005).

Preservation strategies will be based on their potential to alleviate threats and address multiple functions and services, such as improvement of fish and wildlife habitat (increase corridors, reduced fragmentation), increase native species, support for rare species, flood attenuation, and water quality improvement. Projects that can utilize native plant community diversity and natural processes will yield greater functional gains which will meet Vermont's conservation goals and objectives.

In accordance with the Federal Register, 33 CFR 332.2 (f)(3)(h), known as the "Mitigation Rule", preservation-only projects may be used to provide compensatory mitigation when the following criteria are met:

- (i) The resource to be preserved provides physical, chemical, or biological function for the watershed.

- (ii) The resource to be preserved contributes significantly to the ecological sustainability of the watershed
- (iii) The resources are under threat of destruction or adverse modifications
- (iv) The preserved sites will be permanently protected through a legal instrument.
- (v) District Engineer determines the compensatory mitigation is necessary to offset unavoidable impacts to aquatic habitat.

DU's goal for setting ecological criteria for selecting and prioritizing aquatic ecosystems is designed with the explicit purpose of functionally integrating landscapes capable of perpetually sustaining healthy populations of waterfowl and other wildlife through retention and restoration of their ecological integrity. DU's conservation plan focuses on landscapes, functional and ecological integrity of natural processes. The main conservation principles include:

- (i) Focus on essential wetland habitat
- (ii) Use ecosystem management
- (iii) Conserve existing habitat
- (iv) Use appropriate levels of management intervention
- (v) Integrate adaptive resource management

The broad approach of DU's conservation goals leads to water quality improvements, flood control, and soil and water conservation. DU's conservation mission and goals address the Mitigation Rule's requirements for preservation. Preservation shall be done to protect all aquatic resource and associated buffer restoration, establishment, and/or enhancement activities. DU's conservation actions are designed to abate threats, maintain and restore functioning wetland complexes, and to sustain these complexes in perpetuity.

Element VIII: Description of stakeholders' involvement

As the DU-VT ILF Program sponsor, DU will optimize compensatory mitigation efforts under the DU-VT ILF Program by working closely with interested agencies, other organizations, and private entities (see Table 7). In addition, DU will continue to work closely with other conservation entities, public and private organizations, agencies, and landowners (see Table 8) to identify stream and wetland mitigation opportunities and develop mitigation plans and assessment methods. Methods for assessing aquatic resource functions pre- and post-project implementation will be coordinated with ongoing efforts by DEC and other entities in Vermont. This will allow the DU-VT ILF Program efforts to dovetail with ongoing inventory and monitoring efforts.

DU's team of mitigation biologists, engineers, and GIS specialists can provide full service delivery of high quality mitigation projects, (i.e., site identification, wetland construction and plan implementation, performance monitoring, long term protection via easements, adaptive management plans, and accounting and financial assurances). However, DU staff members continue to work closely with

volunteers and partners to deliver an effective landscape-level program across North America. Partnerships with organizations and agencies are a critical element of DU conservation initiative and assist with identifying treats, development of conservation objectives, design of action plans to abate threats, and restore critical habitat. Cooperating with partners and combining biological data and goals will allow for successfully meeting conservation goals.

DU will continue to develop and build partnerships that share common goals and understandings. For example, developing partnerships and management strategies with conservation groups and other private landowners can provide technical and financial assistance for wetland protection, enhancement, and management. Partnerships will also benefit wetland dependent wildlife by improving water quality, conserving critical wetland habitat, and expanding on existing conservation lands. Partnerships allow for a coordinated identification of current threats to conservation targets, implementation of management plans to abate threats, and ensure long term protection at a variety of ecoregional scales. DU will develop a diversity of partners from state, federal, private, academic, and industrial entities (Table 7) which will provide alliances and collaboration required to achieve successful conservation results.

Table 7: List of potential Partners and Stakeholders in Vermont (*adapted from "Vermont's Partners for Fish and Wildlife"*)

Federal Government Agencies:

- Natural Resource Conservation Service
- US Fish and Wildlife Service
- National Parks Service
- US Army Corps of Engineers
- Environmental Protection Agency
- Natural Resource Conservation Districts
- US Forest Service
- National Oceanic and Atmospheric Administration

State Agencies:

- Vermont Agency of Natural Resources (i.e., Department of Environmental Conservation, Department of Fish and Wildlife, Clean and Clear, etc.).
- University of Vermont Watershed Alliance
- Vermont Agency of Transportation
- Vermont Department of Agriculture, Food and Markets

Private and Non-Government Agencies:

- The Nature Conservancy

- Basin Specific Watershed Alliance Committees and Foundations (i.e., Friends of the Winooski River, Missisquoi River Basin Association, etc)
- Farmers Watershed Alliance
- Lake Champlain Basin Program
- Connecticut River Joint Commission
- Trout Unlimited
- Private landowners
- Forestry and Logging Corporations
- Vermont Land Trust Agencies

Table 8: List of potential functions provided by DU Partners and Stakeholders.

Functions:

- Locate and identify suitable lands
- Hold easements (i.e., Land Trusts)
- Assist with development and implementation of monitoring programs
- Assist with expansion of contiguous habitat
- Provide long term management and protection
- Provide local knowledge and contacts

Element IX: Description of long term protection and management

DU shall be responsible for developing and implementing a long-term protection and management plan for each DU-VT ILF Program project. On publicly-owned property, long-term protection and management may be provided through facility management plans or integrated natural resource plans. On privately-owned property, including property held by DU or other conservation organizations, real estate instruments shall be recorded to guarantee protection. DU will ensure that protection mechanisms are in place prior to release of credits. Draft conservation easements or equivalent protection mechanisms will be submitted to the IRT as part of each project mitigation plan for review and Corps approval.

DU-VT ILF Program projects will be designed, to the maximum extent practicable, to require little or no long-term management efforts once performance standards have been achieved. DU shall be responsible for maintaining DU-VT ILF Program projects consistent with the mitigation plan to ensure long-term viability as functional aquatic resources. DU shall retain responsibility unless and until the long-term management responsibility is formally transferred to a long-term manager with Corps approval. The long-term management plan developed for each DU-VT ILF Program project will include a description of anticipated management needs with annual cost estimates and an identified funding mechanism (such as non-wasting endowments, trusts, contractual arrangements with future responsible parties, or other appropriate financial instruments).

The final conservation easement or equivalent mechanism for long-term protection and management shall be submitted to the Corps and the IRT for review and approval prior to the final release of mitigation project credits. Upon achieving its performance standards and approved transfer of the project for long-term protection and management, DU will request that the Corps issue written “closure certification.”

Element X: Program monitoring and reporting.

Monitoring and Contingency Plans

DU will monitor completed DU-VT ILF Program projects. A standard mitigation monitoring protocol developed by DU which is consistent with the current New England District Corps of Engineers mitigation guidance at the time each ILF project is proposed will be used to provide consistent methods and measurements among sites allowing for additional evaluation of the DU-VT ILF Program as a whole, thus, ensuring performance standards are met. The frequency and duration of monitoring and specific monitoring requirements will be defined in each individual mitigation plan. In general, monitoring reports will include plans, maps, and photographs to illustrate site conditions, a narrative summarizing the condition, monitoring results as compared to performance standards, and recommendations for contingency or adaptive management if needed. The monitoring duration designated in the mitigation plan may be extended by the Corps if performance standards have not been met. The Corps District Engineer may also reduce or waive monitoring requirements upon determination that performance standards have been achieved.

Monitoring and contingency reports will address adaptive management strategies that provide management guidelines and recommendations for future site restoration and monitoring. The responsibility of each participating party will be clearly defined and address procedures to improve or alleviate foreseen or unforeseen threats to the restored wetland habitats and functions. The monitoring and contingency plan will track progress towards measurable goals and their associated objectives.

Element XI: Conclusion

DU is a science-based conservation organization where conservation initiatives and goals often focus on a landscape-level, such as large-scale watersheds, which target waterfowl and wildlife habitat issues, as well as important regional water quality concerns. DU’s mitigation program will develop plans for potential projects throughout Vermont to provide compensatory mitigation for impacts to the state’s waters, including wetlands and streams. DU has an effective approach for implementing a mitigation program that includes a compensation planning

framework to select, secure, and implement aquatic resources and associated upland buffer restoration, establishment, enhancement, and/or preservation activities at the watershed scale, and an adaptive management plan to ensure long-term protection.

References:

Addison County River Watch Collaborative. 2009. Little Otter Creek water quality report. < <http://www.lewiscreek.org/409%20Reports/Tech%20Reports/Draft%20LOC%20Report%2009-05-20.pdf>> Accessed 19 April 2010.

Brown, R. A., editor. 2009. Where the great river rises: an atlas of the Connecticut River Watershed in Vermont and New Hampshire. Dartmouth Collage Press, Hanover, New Hampshire, USA.

Clear water. 2004. Hudson River Watershed Alliance, Strategic Plan. < <http://www.clearwater.org/pdf/watershedplan.pdf>> Accessed 10 January 2010.

Deer Field River Watershed Association. 2010. Deerfield River Ecology. <<http://www.deerfieldriver.org/>> Accessed 2 February 2010.

Department of Defense. 2008. Compensatory Mitigation for losses of aquatic resources, final rule. Environmental Protection Agency, Federal Register 73(70):19594-19705.

Francis, S. F., and A. D. Mulligan, editors. 1993. Connecticut River Corridor Management Plan. Connecticut River Joint Commission, Charlestown, NH, USA.

Gerhardt, F. 2009. Restoring water quality in the Lake Memphremagog Basin: nutrient and sediment sources along the John's and Seven small tributaries, Final report. Memphremagog Watershed Alliance, Derby, VT, USA.

Gerhardt, F., and M. Dyer. 2006. Restoring water quality in the Lake Memphremagog basin: Water quality in the four Vermont Tributaries. Northwoods Stewardship Center, East Charleston, VT, USA.

Hruby, T., K. Harper, S. Stanley. 2009. Selecting Wetland Mitigation sites using a watershed approach. Washington Department of Ecology, Publication 09-06-032, Olympia, WA, USA.

Lake Champlain Basin Program. 2003. Management Plan. < <http://www.lcbp.org/>> Accessed 20 January 2010.

- Lake Champlain Basin Program. 2008. State of the Lake and ecosystem indicators report. < <http://www.lcbp.org/PDFs/SOL2008-web.pdf>. > Accessed 12 February 2010.
- Morrissey, L. A., and W. R. Sweeney. 2006. Geographic information systems and water resource IV. AWRA Spring Specialty Conference, Huston, Texas, USA.
- Natural Resource Board. 2002. Vermont Wetland Rule. Water Resources Board, Montpelier, Vermont , USA.
- New York State Department of Environmental Protection. 2010. Upper Hudson River Watershed. < <http://www.dec.ny.gov/lands/48019.html>> Accessed 18 February 2010.
- US Environmental Protection Agency. 2008. Handbook for developing watershed plans to restore and protect our waters. <http://www.epa.gov/nps/watershed_handbook/> Accessed 29 January 2010.
- US Environmental Protection Agency. 2010. Surf your watershed. <<http://cfpub.epa.gov/surf/locate/index.cfm>> Accessed 10 February 2010.
- US Fish and Wildlife Service. 2001. Vermont's partners for fish and wildlife. < <http://www.fws.gov/northeast/partners/Documents/State%20Summaries/Vt-needs.pdf>.> Accessed 9 January 2010.
- US Fish and Wildlife Service. 2010. Biological values of the Connecticut River watershed's Special Focus Areas. <www.fws.gov/R5soc/library/about/SFA_table.doc> Accessed 9 January 2010.
- Vermont's Agency of Natural Resources. 2002. Basin 1: Batten Kill, Walloomasac River, and Hoosic River Watersheds water quality and aquatic habitat assessment report. Department of Environmental Conservation, Waterbury, VT, USA.
- Vermont's Agency of Natural Resources. 2007. Lake Champlain Basin Wetland Restoration Plan. <http://www.vtfishandwildlife.com/library/Reports_and_Documents/Wetland_Protection_and_Restoration_Program/Lake_Champlain_Basin_Wetlands_Restoration_Program/reportfinal.pdf> Accessed 10 April 2010.
- Vermont's Agency of Natural Resources. 2008. Basin 11 management plan. Department of Environmental Conservation, Waterbury, VT, USA.

Vermont Department of Environmental Conservation. 2003. Basin 2 Poultney and Mettowee Basin Progress summary. < http://www.anr.state.vt.us/dec/waterq/planning/docs/305b/pl_305b04-apdxa.pdf> Accessed 20 January 2010.

Vermont Department of Environmental Conservation. 2003. Water Quality Division. <http://www.anr.state.vt.us/dec/waterq/planning/htm/pl_memphremagog.htm.> Accessed 8 January 2010.

Vermont Department of Environmental Conservation. 2004. Missisquoi River watershed water quality and aquatic habitat assessment report. < http://www.vtwaterquality.org/mapp/htm/..%5Cdocs%5Cmp_basin6assessmnt.rpt.pdf> Accessed 19 April 2010.

Vermont Department of Environmental Conservation. 2005. Vermont's Wildlife Action Plan. < http://www.vtfishandwildlife.com/swg_cwcs_report.cfm>. Accessed 19 July 2010.

Vermont Department of Environmental Conservation. 2007. Vermont Watershed Initiative: Guidelines for watershed planning. <http://www.anr.state.vt.us/dec/waterq/planning/docs/pl_planningguidelines.pdf.> Accessed 30 January 2010.

Vermont Department of Environmental Conservation. 2009. Lake Memphremagog, Coaticook & Tomifobia Rivers Basin Planning. < http://www.anr.state.vt.us/dec/waterq/planning/docs/305b/pl_305b04-apdxa.pdf > Accessed 13 April 2010.

Vermont Department of Environmental Conservation. 2009. Lake Memphremagog, Coaticook and Tomifobia Rivers Basin Planning. < http://www.anr.state.vt.us/dec/waterq/planning/htm/pl_memphremagog.htm> Accessed 25 February 2010.

Vermont Department of Environmental Conservation. 2009. Lamoille River Basin water quality management plan. < http://www.vtwaterquality.org/planning/docs/pl_basin7.finalplan.pdf> Accessed 19 April 2010.

Vermont Department of Environmental Conservation. 2009. Specific basins and planning activities. < http://www.vtwaterquality.org/planning/htm/pl_basins.htm> Accessed 19 April 2010.

Vermont Department of Environmental Conservation. 2010. Winooski River Basin Planning. < http://www.vtwaterquality.org/planning/htm/pl_winooskibasin.htm.> Accessed 19 April 2010.

U.S. Fish and Wildlife Service. 2001. Partners for fish and wildlife, Vermont. <

<http://www.fws.gov/northeast/partners/PDF/VT-needs.pdf>>. Accessed 19 July 2010.

Key 1-1. Site selection key for potential mitigation projects

Points in right hand column (i.e., steps 3-14) are used for ranking wetlands (i.e., step 16).

Steps:

- 1) Listed by HUC8, collect data regarding mitigation requirements based on permits issued by USACE [i.e., total acres of each wetland impact type (PEM, PSS and/or PFO) and wetland functions and values that must be replaced]; continue to 2.
- 2) Identify service area with the wetland impact. Mitigation sites should be in the same service area as impact site;* continue to 3.

**If no site can be identified in same service area, contact USACE and IRT for approval to work outside service area, then proceed to 3.*

- 3) Does the watershed have priority conservation areas as identified by federal, state, or NGO agencies (e.g., TNC priority landscapes, DEC conservation areas)?**
 - a) if Yes, proceed to 5 using the identified priority areasPOINTS = 1
 - b) if No, proceed to 4

*** Show preference for mitigation projects in priority areas.*

- 4) Can co-ordination efforts with stakeholders locate potential properties within the watershed (i.e., NRCS's Wetlands Reserve Program lands, real-estate lands, federal or state lands)?
 - a) if Yes, proceed to 5 using identified sites.POINTS = 1
 - b) if No, proceed to 5.POINTS = 0
- 5) Map National Wetland Inventory Data, State wetlands, priority conservation areas, Vermont TNC natural areas, and agricultural lands layer and identify site(s).
 - i) Is the entire site classified as a wetland?
 - a) if Yes, proceed to 5 (ii)POINTS = 0
 - b) if No, proceed to 5 (iii).POINTS = 1
 - ii) Does the site include preservation or is it already preserved?
 - a) if Yes, proceed to 5 (iii)POINTS = 1
 - b) if No, remove site from consideration and return to 4
 - iii) Are there adjacent wetlands to the property?
 - a) if Yes, proceed to 5 (iv).POINTS = 1
 - b) if No, proceed to 5 (iv).POINTS = 0

- iv) Are there adjacent protected conservation lands?
 - a) If Yes, proceed to 6POINTS = 1
 - b) If No, proceed to 6.....POINTS = 0

- 6) Map hydric soils using data layers (e.g., NRCS Web Soil Surveys).
Are there soils on the property that would support the wetland restoration?
 - a) if Yes, proceed to 7.....POINTS = 1
 - b) if No, remove site from consideration.

- 7) Will the mitigation site expand or improve State, federal or NGO priority conservation areas in Vermont?
 - a) If Yes, proceed to 8POINTS = 2
 - b) If No, Proceed to 8POINTS = 0

- 8) i) Is the mitigation site in the same 8-digit Hydrologic Unit Code (HUC) as the impact site?
 - a) if Yes, proceed to 9 POINTS = 2
 - b) if No, proceed to 8 (ii).....POINTS = 0
 ii) Is the site in the same 6-digit HUC as the impact site?
 - a) If Yes, proceed to 9.....POINTS = 1
 - b) If No, proceed to 9.....POINTS = 0

- 9) Contact landowner. Will the landowner be willing to allow DU to complete a wetland mitigation project on their property and grant a conservation easement to DU or other appropriate easement holder?
 - a) if Yes, proceed to 10.POINTS = 1
 - b) if No, remove site from consideration, return to 4.

- 10) Perform a site visit and ground-truth the property (with landowner permission), and evaluate property characteristics and record detailed site description, then continue to 11.

- 11) Will the site support the proposed wetland acres for the mitigation project?
 - a) if 50-100% of total acres, proceed to 12.POINTS = 2
 - b) if 26-49% of total acres, proceed to 12.POINTS = 1
 - c) if 1-25% of total acres, proceed to 12POINTS = 0

****Sites can be combined to meet acres requirements for mitigation projects*

- 12) Are there logistical or environmental constraints that would jeopardize successful wetland mitigation?
 - a) eliminate site from consideration.
 - b) if No, proceed to 13POINTS = 2

- 13) Coordinate with Federal and State agencies (i.e., USFWS, Vermont Fish and Wildlife Department).
 - i) Does the site have state or federal threatened or endangered (E&T) species whose habitat and/or range overlap the site?
 - a) if Yes, proceed to 13 (ii).....POINTS = 1
 - b) if No, proceed to 13 (ii)POINTS = 0
 - ii) Does the site support a wildlife species addressed in the Vermont Wildlife Action Plan?
 - a) if Yes, then proceed to 13(iii).....POINTS = 1
 - b) if No, then proceed to 13(iii)POINTS = 0
 - iii) Does the site support one or more exemplary wetland natural communities as defined by the Vermont Non-Game Natural Heritage Program?
 - a) If Yes, proceed to 13(iv)POINTS = 1
 - b) If No, proceed to 13 (iv).....POINTS = 0
 - iv) Will any wetland mitigation negatively impact Vermont's E&T species or species of greatest concern listed in the Wildlife Action Plan?
 - a) if Yes, remove site from consideration.
 - b) if No, proceed to 14.
- 14) Coordinate with State agencies (e.g., Vermont Fish and Wildlife Department). Can the wetland mitigation assist with current conservation strategies or goals (i.e., Vermont's Wildlife Action Plan, Vermont's nongame and natural heritage program)?
 - a) if Yes, work with agencies to improve the wetland mitigation plan, then proceed to 15POINTS = 1
 - b) if No, proceed to 15.....POINTS = 0
- 15) Repeat 3-14 until ≥ 5 potential sites have been identified with ranks, then continue to 16.
- 16) Rank sites base on point values (in right margin 3-14), then continue to 17.
- 17) Provide list to New England District Corps of Engineers for review, comment, and approval by IRT. A narrative, locus, and concept plan will be included for each site. A site visit by the IRT will generally be held. Continue to 18.
- 18) Begin the DU-VT ILF Program mitigation project.

Appendix V: 2010 Credit Fee Schedule

Resource Compensation Rates 01/0/11 – 06/30/12	
Service Area	2010 Fee for one (1) credit of wetland mitigation
Connecticut River	\$110,031 (\$2.53/sf)
St. Francois	\$111,986 (\$2.57/sf)
Richelieu	\$131,549 (\$3.02/sf)
Upper Hudson	\$129,326 (\$2.97/sf)

The above credits prices per service area were developed based on the following criteria and their associated costs and fees (as noted in “**Project-specific credits and fee schedules**” page 17).

- i) Site identification
- ii) Land acquisition (i.e., land purchase, legal fees, land taxes, etc.)
- iii) Project Design and Planning (i.e., mitigation plan, surveys, wetland design plans, permitting, cultural resource assessment, etc).
- iv) Wetland Construction (i.e., planting plan, contractor, surveys, over-site, water control structure, etc).
- v) Protection, Conservation Easements (i.e., title work, primary property investigation, baseline documentation report (BDR), legal administration, etc.)
- vi) Endowment Fee
- vii) Monitoring (5 year period)
- viii) Contingency Measure/Adaptive management
- ix) Financial Assurances
- x) 15% Administration Fee