VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION

RCPP WETLAND RESTORATION SITE PRIORITIZATION PROJECT MAP INTRODUCTION

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
WETLANDS PROGRAM

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INTRODUCTION

Wetland restoration provides many benefits including water quality protection, flood attenuation, and wildlife habitat. There are programs that provide assistance and payments to landowners to restore functions to marginal, drained agricultural wetlands. A new online map (http://arrowwoodvt.com/rcpp/) identifies numerous potential restoration opportunities throughout the Lake Champlain basin. Additional information is available for higher ranking sites, including proposed easement boundaries, ownership, existing and proposed conditions, and maps.

PROJECT BACKGROUND

The State of Vermont, in partnership with 25 organizations, agencies, businesses and non-profits, received funding in 2015 from the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) through the Regional Conservation Partnership Program (RCPP). This $16 million grant was the second largest in the country and is helping landowners in the Lake Champlain Basin of Vermont and New York invest in best conservation practices to improve water quality.

The Lake Champlain RCPP provides financial and technical assistance to agricultural and forest landowners to develop and implement site-specific farm and forest projects that will directly improve water quality in streams and rivers that flow towards Lake Champlain. The RCPP funds will also help conserve important and environmentally critical agricultural lands, and restore and protect wetlands crucial to attenuating sediment and nutrients and slowing floodwaters. These funds are committed through 2020, but may be extended, or new sources made available, in the future. Through the NRCS Wetlands Reserve Easements (WRE) Program, landowners are compensated for permanently retiring wet agricultural land to restoring wetland acreage and their associated functions and values.

The State of Vermont contracted with Arrowwood Environmental & Fitzgerald Environmental to evaluate and update existing priority wetland restoration data for the Lake Champlain Basin. The contractor has developed an online viewing tool (http://arrowwoodvt.com/rcppmodelsites/) and shapefiles of the revised data to access information pertaining to wetland restoration potential.

ORIGINAL MODEL DEVELOPMENT

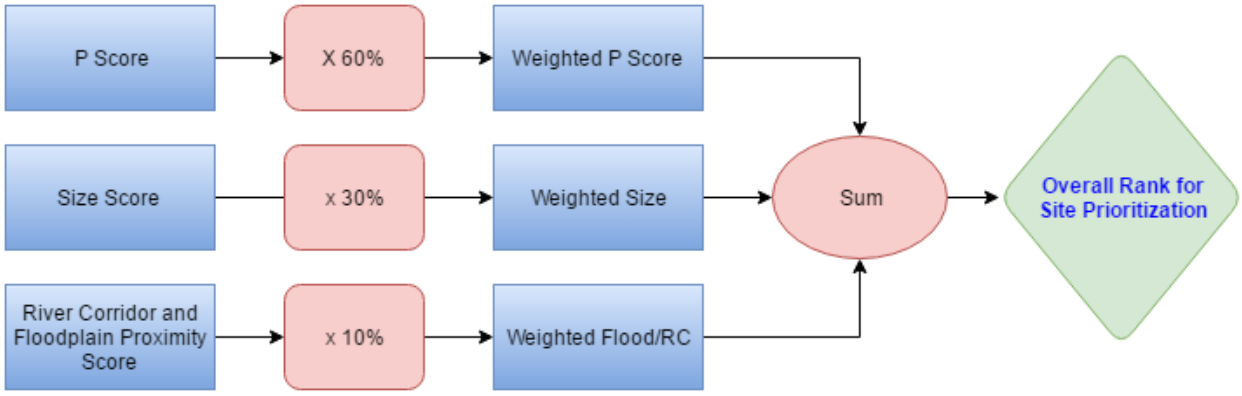
The project builds on a model initially developed in 2007 titled the *2007 Lake Champlain Basin Wetland Restoration Plan (http://dec.vermont.gov/sites/dec/files/wsm/wetlands/docs/2007ChamplainRestorationPlan.pdf)* which was aimed at identifying potential wetland restoration sites with the highest phosphorus retention potential. The original 2007 model was a *quantitative prioritization developed to rank the potential of a restoration site to mitigate phosphorus (P) loading to Lake Champlain based on 11 variables focusing on site function and upslope drainage. Site function reflects a given site's suitability for wetland restoration in the context of P retention, focusing on factors related*

primarily to soils and hydrology. Upslope drainage reflects a given site's drainage area for its potential to transport P to the site, focusing on factors such as land use and soil erodibility. The model identified 4,883 potential restoration sites occupying 86,480 acres (135 square miles) within the Vermont LCB. Sites ranged in size from 3 to 1,490 acres with a mean area of 18 acres. The model scoring and weighting system resulted in an ordinal ranking of candidate sites, where highest scoring sites have the greatest potential for P removal. (Executive Summary – Attachment 1)

DESCRIPTION OF UPDATED MODEL

The priority geographic areas for the updated project are the watersheds for Missisquoi Bay, St. Albans Bay and South Lake A & B; however, the modeling includes lands throughout the Lake Champlain Basin. 2017 updates primarily involved utilizing the original polygons and regrouping sites based on proximity and geographic breaks. Previously identified polygons were grouped with polygons within 100 meters based on the assumption that these proximal polygons are likely functioning as a single site. Polygons that extended across large rivers and roads were split based on the assumption that ownership is quite likely to change across these significant boundary features.

Original P scores were retained and the resulting grouped/split polygons and grouped polygons were reprioritized based on three factors: weighted P score, weighted size, and weighted floodplain/river corridor shown here:



Weighted scores were then summed for each new polygon/group to create an updated site ranking. Additional information regarding the polygon grouping and subsequent reprioritization in included in the attached refinement memo (Refinement Memo - Attachment 2) . Resulting data was used to create a GIS-based map set to be utilized by restoration and conservation professionals to target wetland restoration sites.

The *Wetland Restoration Model Site Prioritization Map* is publicly available and depicts the ranked potential wetland restoration sites based on various physical characteristics of an area. The intent of this layer is to identify land that has potential to be a priority for wetlands restoration.

The password protected *Conceptual Wetland Restoration Project Map* layer depicts the highest-ranking sites, as well as some priority sites selected by the project review committee including DEC, NRCS and US F&W. This layer encompasses 250 potential projects with the polygons being possible easement boundaries for these highest ranking model sites. For authorized users, additional project profile information for each of these potential projects is available for download. The site-specific project profiles provide information to support planning and outreach activities related to the proposed easements. Profiles include easement boundary maps, site description, list of potential restoration activities and landowner outreach information. These project profiles utilize publicly available information, but some information can be considered personal in nature and some landowners may be sensitive to data being shared, hence the password protection on the site-specific data. If you have questions or ideas about how your organization would like to use this data, please contact Julie Follensbee or Laura Lapierre of the VT DEC Wetlands Program.

SITE SPECIFIC PROJECT SCREENING

While the maps are an important starting place to locate potential restoration sites, they do not replace or replicate the need for an on the ground resource assessment. This is critical to determine site eligibility for programs or restoration funds. NRCS, USFWS, or DEC Wetlands Program staff would be qualified to do an initial site assessment. Other qualified individuals or organizations may be identified as the project progresses.

Landowner Outreach will be primarily conducted by Partners (NRCS & USFWS) and will be done in a strategic manner by building on previous efforts to achieve benefits including but not limited to water quality improvement, floodplain restoration, and wildlife habitat. Project profiles will be utilized to identify landowners for outreach and discuss site specific restoration opportunities.

NRCS operates the Agricultural Conservation Easement Program (ACEP) which offers Wetlands Reserve Easements (WRE) to landowners who retire land from agriculture, in perpetuity, and restore wetland acreage and associated functions and values. As match to the WRE payment, the State has developed a *Wetlands Payment Calculator* that will determine an incentive payment to accelerate landowner participation in high priority wetland restoration projects. Under a separate process, the State will arrange for cash payments to pilot test this innovative approach. These payments would be in addition to the traditional WRE payments. Questions regarding the NRCS WRE program should be directed to Jim Eikenberry of NRCS.

ATTACHMENT 1

2007 Lake Champlain Basin Wetland Restoration Plan Executive Summary

Excerpt from the 2007 Lake Champlain Basin Wetland Restoration Plan
http://dec.vermont.gov/sites/dec/files/wsm/wetlands/docs/2007ChamplainRestorationPlan.pdf

EXECUTIVE SUMMARY

Introduction

One of the most important functions of wetlands is the ability to attenuate nonpoint source phosphorus (P) and thereby maintain and improve downstream water quality. Because of this capacity, restoration of degraded wetlands could be an important component of overall efforts to reduce nonpoint source P loading to Lake Champlain. This project was conducted to develop a basin-wide wetland restoration plan through the identification and prioritization of wetlands in the Vermont portion of the Lake Champlain Basin (LCB) with the greatest potential for P removal through restoration.

Site Selection

Potential restoration sites on the 2.9 million acres of the Vermont portion of the LCB were identified using a geographic information system (GIS) model. Non-forested agricultural and other open land sites were inventoried according to criteria that included hydric soils, slopes equal to or less than five percent, National Wetlands Inventory data, and size equal to or greater than three acres. The result was a preliminary set of potential agricultural and other open area sites for wetland restoration.

The model identified 4,883 potential restoration sites occupying 86,480 acres (135 square miles) within the Vermont LCB. Sites ranged in size from 3 to 1,490 acres with a mean area of 18 acres. These sites were distributed among the six subbasins across the LCB, with the greatest number of sites in the Lake Champlain Direct, Otter Creek, and Missisquoi River watersheds.

Site Prioritization

A quantitative prioritization model was developed to rank the potential of each restoration site to mitigate P loading to Lake Champlain based on 11 variables focusing on site function and upslope drainage. Site function reflects a given site's suitability for wetland restoration in the context of P retention, focusing on factors related primarily to soils and hydrology. Upslope drainage reflects a given site's drainage area for its potential to transport P to the site, focusing on factors such as land use and soil erodibility. The specific variables that were evaluated for each of the two categories follow:

- Site Function
- Soil texture
- Erosion risk
- Size class
- Flood class
- Proximity to surface waters
- Upslope drainage
- Slope
- Erosion risk
- Estimated P load
- Hydrologic soil group
- Land cover
- Drainage area to wetland area ratio

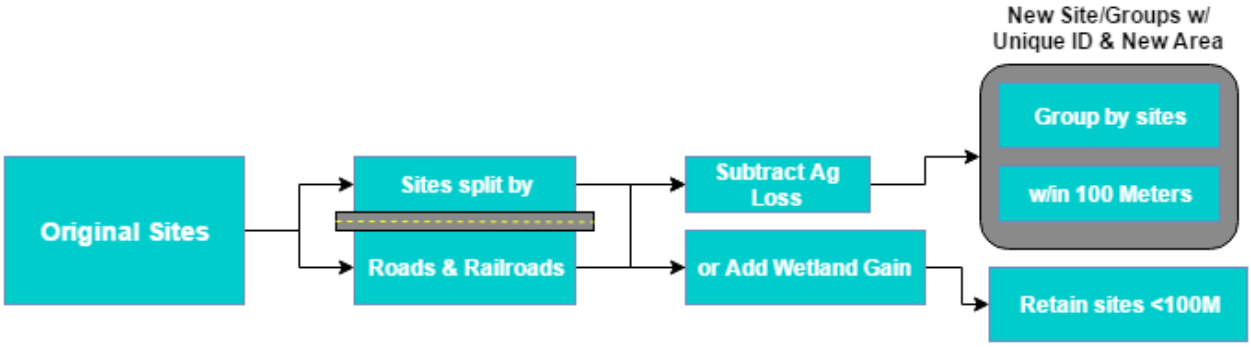
Excerpt from the 2007 Lake Champlain Basin Wetland Restoration Plan
http://dec.vermont.gov/sites/dec/files/wsm/wetlands/docs/2007ChamplainRestorationPlan.pdf

The model scoring and weighting system resulted in an ordinal ranking of candidate sites, where highest scoring sites have the greatest potential for P removal. While the model identified highly-ranked sites in all subbasins in the Vermont LCB, sites in the Otter Creek subbasin had the highest mean restoration score, followed by sites in the Lake Champlain Direct subbasin. These scores reflected a high proportion of agricultural land in close proximity to surface waters with clay soils in soil hydrologic groups C and D characteristic of these subbasins. The high ranking of sites in the Otter Creek subbasin, which generates high nonpoint source P loads and is targeted for significant P load reduction in the Lake Champlain P TMDL, suggests that the Otter Creek subbasin would be an appropriate target for initial wetland restoration efforts. At the same time, the model identified high ranking sites in all sub-basins. The Missisquoi River subbasin has been targeted with the highest P reduction goal of all LCB subbasins, and as such may also be a good place to focus initial restoration efforts along with the Otter Creek subbasin.

ATTACHMENT 2

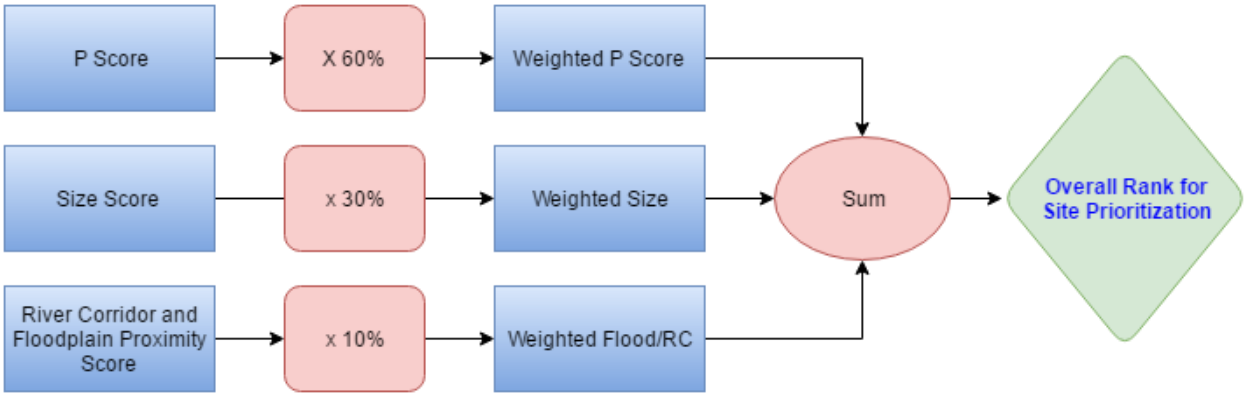
2017 RCPP Wetland Restoration Model Refinement Memo

Revised Site Grouping



Steps	Name	Description
1	Site Split ID	The original Basin project sites have been split by roads (or railroads) and given a new ID based on the original site ID. So an original site ID 81 that was split once by a road now has two records with Site_Split_IDs 81.1 and 81.2. Any original sites that were not split retain the original site ID in the Site_Split_ID field. The purpose of this splitting step is to treat wetlands divided by roads and railroads separately since their functions likely differ, and there is often a change in parcel ownership across the road.
2	Acres Split	The revised acreage for each portion of a site split by roads or railroads is calculated.
3	Acres AgLoss	The revised acreage for each portion of a split site after accounting for the agricultural land lost in the 2001-2011 National Land Cover Dataset (NLCD) Change Matrix is calculated. AgLoss represents the percent of area for each polygon that was either lost as Ag land or gained as Wetland according to the NLCD change matrix.
4	Group ID	Model parameters group any sites within 100M of another site, not across a road or railroad. This is the unique ID of the group the site belongs to. The purpose of this step is to link nearby wetland sites that likely function together but were not mapped as contiguous due to limitations of mapping data in original prioritization model.
5	Group AgLoss	The cumulative acreage of all sites participating in a group. For sites not part of a group, the Acres_AgLoss (Step 3) is used.

Revised Site Prioritization



Update Prioritization of Sites based on original P retention score, the newly calculated site area and proximity to floodplains and river corridors.

1. P Retention Score Factor:

   A. Take component sites and weight by size to calculate new P Retention Score for groupings. Accept original P score assigned per component site, use new sizing from taking out ag-loss, calculate proportional size of each component relative to the total group.

   Example Group 1 (comprised of component sites 1-3)

Component	Original P Score	New Size (acres)	Size proportion for group	Group P Score
Site 1	120	50	0.588235294	70.58824
Site 2	210	25	0.294117647	61.76471
Site 3	325	10	0.117647059	38.23529
	Grouping	**85**	**1**	**170.5882**

   B. Apply quartile statistical analysis to develop four score brackets. Apply 60% weight to new Group P Score.

Group P Score	Rank Score	Weight	Weighted Rank Score
0-230	1	60.00%	0.6
230-265	2	60.00%	1.2
265-299	3	60.00%	1.8
299-435	4	60.00%	2.4

2. Size Factor

   Apply approximate quartile statistical analysis to develop four size brackets. Apply 30% weight to new Group Size:

Grouping Size (acres)	Rank Score	Weight	Weighted Rank
<10	0	30.00%	0.0
10-15	1	30.00%	0.3
15-25	2	30.00%	0.6
25-50	3	30.00%	0.9
>50	4	30.00%	1.2

3. River Corridor and Floodplain Proximity Factor. Apply 10% weight to proximity and overlap criteria:

Site Proximity and Overlap with River Corridor (RC) and FEMA Floodplain (FP)*	Rank Score	Weight	Weighted Rank
Not within 100ft of RC/FP	0	10.00%	0.0
No overlap but within 100ft of RC/FP	1	10.00%	0.1
<10 acres overlap	2	10.00%	0.2
10-25 acres overlap	3	10.00%	0.3
>25 acres overlap	4	10.00%	0.4

   * RC and FP merged together for spatial analysis

4. New Rank for Site Prioritization

   Sum the weighted ranks for new Group P Score (Section 1.B), new weighted Group Size (Section 2), and weighted River Corridor and Floodplain Proximity factor (Section 3). The summation represents the new rank for the restoration sites to be used for site prioritization.