2

Development of a Wetland Restoration Assessment Model

In order to identify and prioritize potential wetland restoration sites in the Merrimack River Watershed, a "Wetland Restoration Assessment Model (WRAM)" was built, consisting of two components: the "Site ID Model" and the "Site Prioritization Model." The Site ID Model was used to identify candidate wetland restoration sites and the Site Prioritization Model was used to assess which of those sites would result in significant environmental benefit and would thus be considered high priority. Both models were developed using GIS data with ESRI® ArcGIS tools and Model Builder software.

In combination, the two models were used to generate a GIS data set of potential wetland restoration sites, categorized according to their potential benefit to the watershed. The basis for the WRAM is explained in detail in this chapter. The model output was then used to select priority sites for further investigation including conducting site visits and development of conceptual wetland restoration plans.

2.1 Watershed Geodatabase

VHB assembled available natural resource and land-use information to create a geodatabase that formed the basis of the WRAM. The GIS was developed using ESRI ArcGIS 9.2, and contained relevant natural resource and infrastructure data from GRANIT, NHDES, the NH Fish and Game Department (NHF&G), the NH Department of Resources and Economic Development (NHDRED), the Society for the Protection of NH Forests (SPNHF) and the Nature Conservancy (TNC), as well as relevant data provided by several watershed communities.

A combined wetland data layer was created by dissolving National Wetlands Inventory (NWI) data with poorly and very poorly drained soil units as contained in the Natural Resource Conservation Service's (NRCS) digital soils mapping. This data layer formed the basis of the identification and prioritization of sites and is referred to as the "Composite Wetlands." Rectification of the boundaries of the Composite Wetlands to topographic information was completed for a subset of wetlands, most notably the "Priority Sites." It is recognized that the process used to develop the Composite Wetland data does not capture all of the jurisdictional wetlands in the watershed, but the identification of additional wetlands was not within the scope of the project.

2.2 Site Identification Model

2.2.1 Methodology

The purpose of the Site ID Model is to identify impacted wetlands that could serve as a set of candidate sites for input into the Site Prioritization portion of the WRAM. The Site ID model is relatively straight forward, and involved a basic screening method as follows.

In order to be included in the set of Candidate Sites, a Composite Wetland must meet the following criteria (See **Tables 2-1** and **2-2**):

1. Some portion of the wetland is identified by the National Wetlands Inventory (NWI) as having one or more of the following Cowardin, et al. (1979) special modifiers:

   - "d" = partially drained/ditched;
   - "h" = diked/impounded; or
   - "x" = excavated.[5]

2. Any portion of the wetland intersects an area mapped as "Agricultural" or "Other/Disturbed" land cover classifications using the most recent NH Land Cover Classification coverage (Justice, et al. 2002). Specifically, the following cover classes were included in this screening:

   - Barren lands,
   - Orchard,
   - Other agriculture,
   - Hay/pasture or row crop
   - Disturbed land
   - Other cleared lands

3. Finally, Candidate Sites less than five acres in size were excluded. This criterion was based on a review of the literature which suggests that restoration success is most likely when working in or adjacent to wetlands at least five acres in size.

[5] Note that the Cowardin classification system does contain other Special Modifiers that could be diagnostic of impacted wetlands. However, these other modifiers are not used in the Merrimack River Watershed.

VHB conferred with NHDES and the Technical Advisory Group to refine the Site ID Model to ensure that an acceptable study set was generated. It is also important to note that the Site ID Model was not the sole method used to identify Candidate Sites.

GIS data from state and federal sources were used to construct the model and are presented in **Table 2-1**. The individual model inputs were evaluated based on the value of specific attributes of the source data, as presented in **Table 2-2**.

Table 2-1. Site ID Model Base Data

Model Input	GIS Data Source	Data Type	Scale	Data Provider –Date
Hydric Soils	Soil Survey Geographic Database (NRCS Soils)	Vector	1:12,000	NRCS – 1965, 1968, 1973 1981, 1985, 1993, 2008* (Preliminary)
Land Cover	NH Land Cover Assessment	Raster	30-Meter	NH GRANIT – 2001
NWI Wetlands	USFWS Wetlands	Vector	1:24,000	US Fish and Wildlife Service
NHB Data	Exemplary Natural Communities, Low Condition Score	Vector	1:24,000	NH Natural Heritage Bureau

2.2.2 Site ID Model Results

The final product of the site identification model was a GIS dataset consisting of 906 polygon features that represent potential restoration sites. In addition to the 906 sites identified by the Site ID Model, the NH Natural Heritage Bureau (NHB) provided an additional 45 sites from their exemplary natural community database. These sites were identified by NHB as having a low "condition score," which was assigned based on their assessment of the wetland and which indicates some level of possible impairment.

The resulting set of 951 "Candidate Sites" occupies approximately 9,771 acres (15.3 square miles) within the watershed. Potential sites ranged in size from the minimum value of 5 acres to a maximum of 101.6 acres with a mean site area of approximately 10.6 acres. These sites are distributed among the 65 of 73 towns located in the watershed as shown in **Table 2-3**. Maps showing all of the 951 Candidate Sites are included in **Appendix B**.

Table 2-2. Site Identification Model Attributes

Input/Data Source	Attribute	Potential Values	Potential Site
NWI Wetlands	NWI Type	E – Estuarine	No
		L – Lacustrine	No
		P – Palustrine	Yes
		R – Riverine	No
NWI Wetlands – Modifiers	NWI Code (last digit of field)	b – Beaver	No
		r - Artificial Substrate	No
		s – Spoil	No
		h - Diked/Impounded	Yes
		f – Farmed	No
		d - Partial Drained/Ditched	Yes
		x – Excavated	Yes
NRCS Hydric Soils[1]	Hydric	Y	Yes
		N	No
NH Land Cover Assessment	Land Cover Class	110 Residential/Commercial/Industrial	No
		140 Transportation	No
		211 Row Crops	Yes
		212 Hay/Pasture	Yes
		221 Fruit Orchards	Yes
		412 Beech/Oak	No
		414 Paper Birch/Aspen	No
		419 Other Hardwood	No
		421 White/Red Pine	No
		422 Spruce/Fir	No
		423 Hemlock	No
		424 Pitch Pine	No
		430 Mixed Forest	No
		440 Alpine	No
		500 Water	No
		610 Forested Wetland	No
		620 Open Wetland	No
		630 Tidal Wetland	No
		710 Disturbed	Yes
		720 Bedrock/Veg.	No
		730 Sand Dunes	No
		790 Other Cleared	Yes
		800 Tundra	No

Note:
1 Soils with null values were not considered hydric

Table 2-3. Site Identification Results by Watershed Community

Town/City	Total Area (Acres)	Number of Sites	Area of Sites (Acres)	Percent of Town
Allenstown	13,167	13	110.7	0.8%
Alton	9,429	3	21.8	0.2%
Amherst	22,025	33	306.1	1.4%
Atkinson	7,259	4	24.9	0.3%
Auburn	18,438	37	179.1	1.0%
Barnstead	28,759	28	203.7	0.7%
Bedford	21,156	33	325.4	1.5%
Bennington	221	1	0.0	0.0%
Boscawen	10,792	13	144.7	1.3%
Bow	18,269	14	112.5	0.6%
Candia	7,166	7	70.7	1.0%
Canterbury	28,697	26	269.5	0.9%
Chester	4,157	2	20.0	0.5%
Chichester	13,628	12	114.1	0.8%
Concord	36,500	50	555.4	1.5%
Danville	5,575	8	77.6	1.4%
Deerfield	6,592	2	12.1	0.2%
Deering	12,813	8	58.0	0.5%
Derry	22,731	29	365.7	1.6%
Dunbarton	20,005	23	187.7	0.9%
East Kingston	3,144	9	122.5	3.9%
Epsom	22,153	29	245.4	1.1%
Francestown	19,315	9	106.9	0.6%
Franklin	7,100	5	62.6	0.9%
Gilmanton	35,438	26	254.7	0.7%
Goffstown	24,065	12	127.3	0.5%
Greenfield	8,181	3	25.4	0.3%
Greenville	2,508	2	33.3	1.3%
Hampstead	8,170	11	90.7	1.1%
Henniker	3,300	2	14.5	0.4%
Hollis	6,186	9	58.2	0.9%
Hooksett	23,761	18	192.8	0.8%
Hopkinton	4,787	9	75.6	1.6%
Hudson	18,780	29	341.5	1.8%
Kensington	699	4	32.1	4.6%
Kingston	9,744	16	120.3	1.2%
Litchfield	9,784	26	352.1	3.6%
Londonderry	26,958	40	379.0	1.4%
Loudon	29,897	45	428.4	1.4%
Lyndeborough	19,370	10	83.5	0.4%
Manchester	22,355	38	377.6	1.7%
Merrimack	21,412	15	122.6	0.6%

Town/City	Total Area (Acres)	Number of Sites	Area of Sites (Acres)	Percent of Town
Milford	14,440	14	173.7	1.2%
Mont Vernon	10,820	7	51.8	0.5%
Nashua	12,673	14	232.4	1.8%
New Boston	27,654	15	114.8	0.4%
New Durham	412	1	6.1	1.5%
New Ipswich	14,603	16	206.8	1.4%
Newton	6,365	4	24.4	0.4%
Northfield	7,849	2	16.2	0.2%
Northwood	8,556	8	58.9	0.7%
Pelham	17,151	47	724.7	4.2%
Pembroke	14,597	17	177.7	1.2%
Pittsfield	15,555	23	190.3	1.2%
Plaistow	6,790	15	99.6	1.5%
Salem	16,569	44	448.6	2.7%
Salisbury	6,869	6	72.8	1.1%
Sandown	1,615	2	6.2	0.4%
Seabrook	228	1	0.5	0.2%
South Hampton	5,147	7	71.4	1.4%
Strafford	9,200	6	44.7	0.5%
Temple	13,477	11	80.8	0.6%
Weare	37,357	21	252.0	0.7%
Wilton	15,483	13	112.2	0.7%
Windham	17,772	12	112.6	0.6%

2.3 Site Prioritization Model

2.3.1 Methodology

The purpose of the Site Prioritization Model is to categorize each of the Candidate Sites according to its potential benefit. It comprises three components which calculate the following quantities for each of the 951 Candidate Sites:

- **Net Functional Benefit**, which attempts to measure the amount of wetland function and value that could be gained by restoration of a particular site;
- **Sustainability**, which attempts to measure the likelihood that a site, once restored, will retain increased function over the long-term; and
- **Landscape Position**, which assigns value to sites which are located in certain locations which would be of benefit to the restoration (e.g., close to existing conservation land, higher in the watershed).

These three components are weighted independently to derive a final prioritization score that could range from a value of 0 (low priority) to 100 (very high priority). **Figure 2-1** provides an overview of the model.

The methodology for this model was fashioned through a collaborative process using a Technical Advisory Group (TAG) comprising various state agencies, regional planning commissions, and nonprofit groups.

2.3.1.1 Net Functional Benefit Score

Of the three components comprising the Site Prioritization Model, the Net Functional Benefit (NFB) evaluation forms its foundation. The evaluation is based on a modification of the *Method for the Comparative Evaluation of Nontidal Wetlands in New Hampshire* (Ammann & Lindley-Stone, 1991), but also incorporates other elements. The "NH Method" is a well-established and recognized tool that was developed to assist public officials and the greater community in evaluating wetlands at the community or watershed level. The NH Method takes a scientific approach to evaluate 14 Functional Values of wetlands including ecological integrity, wildlife habitat, nutrient attenuation, flood storage and other values.

The TAG reviewed each of the fourteen Functions and Values recognized by the NH Method to set aside those that could not be accomplished without physically viewing each site and identify those that could be answered using GIS technology. In addition, the TAG identified other sources of data from more recent studies that could be incorporated into the NFB Evaluation. For example, the Wildlife Action Plan (WAP) developed by NHF&G contains valuable information on wildlife habitats. The following list summarizes five key elements of the Functional Evaluation (see also **Figure 2**):

Function:	**Ecological Integrity**
Component:	NH Method (FV1)
Function:	**Significant Habitats**
Components:	NH Method, Wildlife (FV2) NH Method, Finfish (FV3) NHNHB Threatened & Endangered Species Database NH Wildlife Action Plan
Function:	**Flood Protection**
Components:	NH Method (FV7) & FEMA Floodplain Data
Function:	**Groundwater Use Potential**
Components:	NH Method (FV8) & NHDES Contamination Sources
Function:	**Water Quality**
Components:	NH Method Sediment Trapping (FV9) NH Method Nutrient Attenuation (FV10) Pollutant Loading Model (Lake Champlain Adaptation) Pollutant Loading Opportunity (NHDES, WMB Model)

The scoring system for the Net Functional Benefit Evaluation follows the NH Method, which assigns a score for each component on a scale of 0.1 to 1.0. A score of

0.1 would indicate a low functioning wetland, and score of 1.0 would indicate a high functioning wetland. **Figure 2-2** outlines the functional evaluation method.

Calculating Net Functional Benefit

In order to calculate the "Net Functional Benefit," defined as the total amount of wetland function and value that would be created through the restoration of a particular site, it was necessary to evaluate both the existing wetland system and the restored wetland. Obviously, the only system observable was the existing wetland. The "restored" wetland functional evaluation, therefore, is a hypothetical estimate of the total function if the site were to be restored. Calculating this quantity involved the following assumptions:

- *For each function, it was assumed that the restored wetland would score a 1.0 for any component that is subject to restoration;*
- *Each of the components for each function was evaluated by a wetland ecologist and was determined either to be subject to restoration or not subject to restoration.*

To illustrate this process, consider the "Ecological Integrity" Function, which was assessed using the NH Method. This particular function is scored by answering a total of twelve questions, ten of which can be addressed using GIS analysis. Of these ten questions, it was determined that six questions measure parameters that could be modified through restoration. **Table 2-4** summarizes these questions and indicates which were considered to be subject to restoration.

Thus, each of the ten parameters/questions was for evaluated for every wetland in the set of 951 Candidate Sites to compute score for the "Existing Condition." (See **Appendix C** for a detailed discussion of how the GIS model addressed each.**)** Then, a "Restored Condition" score was computed by setting the six questions to 1.0, and a new average "Functional Value Index" calculated. The difference between the Existing and Restored scores, known as the "Net Functional Benefit" was interpreted to be a measure of how much functional benefit could be derived if the Candidate Site was restored in total to eliminate all impairments. Obviously, this simplifying assumption cannot be met in every case, so the Net Functional Benefit must be interpreted to be a theoretical maximum benefit. The actual amount of functional benefit will be dependent on the restoration methods used for a site, and the success of those methods.

Once the Net Functional Benefit was calculated, it was weighted by the size of the candidate site (i.e., larger sites will provide a greater amount of function) and the diversity of the site (measured in terms of the number of NWI classes present in the system). Finally, a weighting factor of 70 was applied such that the NFB score made up 70% of the total "Prioritization Score."

Table 2-4. Ecological Integrity (NH Method)

Question/Parameter and (data source)	Included In Model?	Subject to Restoration?
1) Percent of candidate site having very poorly drained soils and/or open water. (NRCS)	Yes	Yes
2) Dominant land use of the candidate site. (NHLCC 2001)	Yes	No
3) Water Quality of the watercourse, pond, or lake associated with the wetland. (NHDES CALM)	Yes	Yes
4) Ratio of the number of occupied buildings within 500' of the wetland edge. (US Census)	Yes	No
5) Percent of original wetland filled (NHDES Wetlands Permits)	Yes	Yes
6) Percent of wetland edge bordered by a buffer of woodland or idle land at least 500 feet in width. (NHLCC, 2001; Area of forest/idle w/in 500')	Yes	Yes
7) Human activity within wetland as evidenced by litter, bike trails, roads, residences, etc.	No	No
8) Human activity in upland within 500 feet of the wetland edge as evidenced by litter, bike trails, roads, residences, etc.	No	No
9) Percent of wetland plant community presently being altered by mowing, grazing, farming, or other activity. (NHLCC, Ag land w/in composite wetland)	Yes	Yes
10) Percent of wetland actively being drained for agriculture or other purposes. (NWI - x, d modified relative to composite wetland)	Yes	Yes
11) Public road and/or railroad crossings per 500 feet of wetland. (NHDOT Roads database)	Yes	No
12) Long-term stability of the site. (NHDES Dams, NWI – modifiers h, x, b)	Yes	No

Note: Each of these questions is contained within "Functional Value 1 – Ecological Integrity" as described by Ammann and Lindley-Stone (1991)

Appendix C contains a detailed explanation of the scoring for the Ecological Integrity functions, as well as the four other major functions included in the Net Functional Benefit score.

2.3.1.2 Sustainability Score

Restoration Sustainability represents 20% of the Site Prioritization Model. This component is intended to account for the fact that a site may have a high Net Functional Benefit, but may not be sustainable in the long term. For example, urban wetlands can be quite degraded and would therefore be expected to provide a high functional benefit. These same sites, however, may be subject to continued degradation due to stormwater runoff and other factors. Conversely, a site located within an unfragmented landscape, conservation management area, or sites located in areas characterized by NHF&G as being uninfluenced by humans, could be expected to retain its improved function (i.e., be more sustainable), and thus should be given a higher score than a site located adjacent to an urbanized area. The factors used to calculate the Restoration Sustainability score are illustrated in **Table 2-5.**

2.3.1.3 Landscape Position Score

Landscape Position, which represents 10% prioritization score, is the final component of the site prioritization model. This component is made up of two elements: sites located in or within 1,000 feet of an existing conservation easement or publicly owned tract of land, and sites located within the headwaters of the watershed. These components were added to the Site Prioritization Model based on feedback from the TAG to reflect important considerations in selecting important restoration sites.

Table 2-5. Restoration Sustainability Scoring

Element	Data Source	Attribute	Element Score	Sustainability Score
Is the site located within an unfragmented landscape?	NHFG WAP; Unfragmented Blocks	N/A	Percent of Site, Continuous 0 – 1	Average of each of the three Element Scores X 20; Range= 0, 6.6, 13.2 to 20
Does the site have a high Human2 score (NHF&G WAP)?	NHFG WAP; Peatlands, Marshed250, Floodplain500 NH GRANIT	Human 2 Score	Continuous 0-1	
Is the site located within a conservation management area?	Conservation/Public Lands Database	M-Status (1-3A)	Absence or Presence 0 or 1	

Table 2-6. Landscape Position Scoring

Element	Data Source	Attribute	Element Score	Landscape Position Score
Is the site located in or within 1,000 feet of an existing conservation easement or publicly owned tract of land?	NHGRANIT	Presence or Absence	Logical 1 or 0	Average of the two Element Scores X 10; Range = 0, 5, 10
Is the site located in the headwaters of the watershed?	NHGRANIT	The site must be located in the top 20% elevation for the sub-watershed that the site is located in	Logical 1 or 0	

2.3.2 Calculating the Priority Score

As discussed above, the final "Prioritization Score" ranged from 0 to 100 and was calculated from three distinct parameters:

1) Net Functional Benefit – ranged from 0 (no benefit) to 70 (highly beneficial)

2) Sustainability – ranged from 0 (not sustainable) to 20 (highly sustainable)

3) Landscape Position – ranged from 0 (poor landscape position) to 10 (advantageous landscape position)

These three independent scores were summed to derive the final Prioritization Score for each of the 951 Candidate Sites. The sites were then assigned to one of three categories based on their rank relative to other sites:

- High Priority,
- Priority, or
- Other Candidate Sites

The Prioritization Score and final categorization for each of the sites is shown on the maps in **Appendix B** and detail in the data tables in **Appendix D**.

2.4 Model Evaluation

This section describes the criteria used to ensure that the GIS model would meet project objectives. The data quality objectives and criteria for this project are described in the following sections.

2.4.1 Objective 1 – GIS Data Standards

Objective 1

To develop a comprehensive Geographic Information System for the Merrimack River Watershed by compiling GIS data from existing databases into an ArcSDE Geodatabase.

Acceptance Criteria

To meet data quality objectives, the following acceptance criteria were used to determine whether data would be incorporated into the project GIS:

- Only GIS data of known origin were used. The primary data were from the databases of GRANIT, NHDES, NH Fish and Game, the NH Department of Resources and Economic Development, The Nature Conservancy, and the Society for the Protection of NH Forests. Secondary data sources included regional planning commissions, municipalities and/or other conservation organizations.
- In each case, only the most recent data revision from the original source of the data layer was sought.
- Only data which has been properly documented to Federal Geographic Data Committee (FGDC) standards was used to build the project GIS.

2.4.2 Objective 2 – Model Performance

Objective 2

To use the Geodatabase to construct a geospatial model which will:

- Identify potential wetland and riparian restoration sites (the "Site ID Model"), and
- Prioritize those sites according to the potential benefit to wetland functions and values that would result from their restoration (the "Site Prioritization Model").

Performance Criteria

The GIS model is heuristic in nature; it was not intended to provide an exact solution, and it was understood that iterative changes in the model would be undertaken, if needed, to improve its performance. The model was expected to identify wetland sites that have a high probability of historical impacts that could be reversed by applying restoration techniques. It was also expected to prioritize those wetland sites according to the potential increase in functional value that would result from their restoration. However, the model was not expected to provide an absolute measurement of "restoration suitability" or any other such hypothetical parameter.

Such a heuristic model is appropriate when the model seeks only to rank or categorize according to a constructed score rather than a measureable parameter or characteristic, but is expected to produce a good solution that will contain or intersect with the solution of the more complex problem (i.e., solving for the optimal restoration strategy).

Performance Assessment Methodology & Results

In order to assess the model's performance in identifying potential restoration sites, an independent quality assurance exercise was undertaken to make sure that the model algorithms worked properly. Specifically, without referring to the results of the Site ID model, the consultant project manager, acting as an independent reviewer, selected 20 palustrine wetland sites using the digital National Wetland Inventory for the towns of Bedford, Weare, New Boston and Goffstown. These 20 wetlands were then reviewed using 2005 color digital orthophotography as well as a brief site visit. Based on this review, each wetland was placed in one of two categories: 1) Potential Restoration Site, or 2) Undisturbed/Intact Wetland. In order for a site to be placed in the former category, a clear impairment must have been evident.

Once each site was classified as above, the results of the Site ID Model were reviewed to determine how the model had classified the same sites. This comparison revealed that the independent reviewer classification and the model classification agreed on 17 of 20 sites, for an 85% correspondence. All three sites that were classified differently by the evaluator and the model were sites that the model identified as a candidate site, but which the independent evaluator classified as undisturbed. Based on these results, it was determined that the Site ID model provided a conservative approach to the identification of candidate restoration sites. This was deemed acceptable and significant changes to the Site ID model component were determined to be unwarranted.

Model performance relative to the prioritization of Candidate Sites was also evaluated through a similar process. The preliminary Site Prioritization Model was run for the 951 Candidate Sites. A subset of 16 sites was selected in the towns of Bedford, Goffstown, New Boston and Weare. The consultant Project Manager then reviewed aerial photography of these sites and conducted a brief field visit. Each of the 16 sites was placed into one of three categories: 1) High priority, 2) Default, or 3)

Low Priority. The "default" category was selected unless one or more characteristics made it clear that the site should be considered a high priority or a low priority. The evaluator's classification was qualitative and informal and was based largely on the degree of disturbance/ecological impact that could be viewed in the field or on the aerials. The feasibility of the restoration was also assessed, with hydrological modifications judged to be more feasible than removal of fill or other forms of impact. The position of the Candidate Site in relation to conservation land and/or other undisturbed wetland systems was also considered.

The results of the Site Prioritization Model were then reviewed to determine whether there was correspondence between the Model categorization and those of the evaluator. For this exercise, the model results were categorized as follows: 1) The sites with the 200 highest "Prioritization Scores" were placed in the "High Priority" Category; 2) The bottom 200 sites were considered "Low Priority" and the remaining 551 sites were considered "Default."

Comparison of the Model categorizations and the evaluator's categorization revealed agreement for 11 of the 16 sites, for a correspondence of 69%. There was no clear pattern among the five sites for which categorizations disagreed, although the evaluator classified three of the five sites as "Default" which the model placed in the High Priority category (n=2) or the Low Priority category (n=1). The evaluator categorized two sites as being Low Priority which were categorized by the Model as belonging to the Default category.

While this correspondence was somewhat lower than desired, given the complexity of the concept of "Restoration Prioritization," it was determined that the Site Prioritization Model was capable of producing acceptable results, and the next step in the study was taken – selection of up to 30 high ranking sites for field evaluation.

2.5 TAG Model Review & Refinements

The review of the top sites to select up to 30 sites for field investigation was conducted in an open meeting format with members of the TAG. This meeting provided additional insight into the results of the model which prompted revisions outlined here:

1. The geographic distribution of the high priority sites was non-random. The Model tended to cluster high priority sites in bottomland/floodplain geomorphic settings. Because this is contrary to some of the literature which suggests that headwater wetlands can be important to functions such as base flow and water quality protection, it was decided to add a component to the model that would provide some additional weight to headwater wetlands. (See "Landscape Position" score, described in Section 2.3.1.3 above.)

2. The initial algorithm for calculating the "Significant Habitats" portion of the functional evaluation tended to overweight finfish habitat relative to other parameters. Based on comments from NH Fish and Game, this algorithm

was changed to give greater weight to terrestrial wildlife habitat data from the NH Wildlife Action Plan and rare species data from the NH Natural Heritage Bureau.

3. Comments from the USEPA reviewer indicated that preference should be given not only to sites within defined conservation lands, but to those adjacent to such areas, since these sites represented a potential opportunity to expand the conservation area. Again, a component was added to the "Landscape Position" score to account for this management strategy which gave additional weight to sites that were within 1,000 ft of the boundary of an existing conservation parcel.

Once these refinements were incorporated into the model, a second full model run was completed, which provided the results presented in this technical report and on the project website.