APPENDIX D:

DEFINITIONS SUBCOMMITTEE MEETING NOTES

“Indirect impacts” means reasonably foreseeable impacts to the following characteristics and functions of wetlands on or contiguous to the site of a project proposal, caused by those portions of a project proposal located in upland areas:

1. The ability of the wetlands and associated surface waters to meet and maintain state water quality standards, and to support and maintain a balanced, integrated, and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of the region;

2. The ability of the wetlands to absorb flood waters and silt and to thereby avoid increased flood damage and silting of associated surface waters;

3. The provision of habitat, food, and reproduction areas for finfish, crustacea, shellfish and wildlife of importance; and

4. The recharge or discharge of groundwater.

HB 1574 Commission to Study Land Development ….
Definitions Subcommittee
3-2-09
Comments prepared by JP Gove (Chair), for Members: Erin Darrow, Laura Deming, Peter Stanley and Peter Walker

I think that the first question is what is it we are actually trying to define?

Secondary Impacts, Indirect Impacts or Cumulative Impacts?

While ultimately, the work of the Commission may well take us to defining Cumulative Effects, I see that as a much larger effort than defining either Secondary Impacts or Indirect Impacts. Being one who likes to work within a framework that has already been set, I see the Subcommittee's first task is to define Secondary Impacts.

First, as noted by Matt Schweisberg in his presentation to us, Secondary Impacts are defined under the Clean Water Act, and as such are tied to the State of New Hampshire's wetlands program via the State Programmatic General Permit. Indirect impacts are defined in the National Environmental Policy Act, which is not tied to the State's wetlands program.

Second, I believe we want to first address projects that have wetland impacts of dredge or fill, and not address projects that are just close to wetlands (adjacent), but do not touch wetlands. To go directly to the EPA slide:

"40 CFR 230.11 (h) (1) Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill materials."

This limitation to Secondary Effects or Impacts will keep our definition tied to the Chapter 482-A Public Purpose. As noted in some of the past testimony, this will not be construed as statewide zoning, but will be tied to projects that have applied for a Dredge and Fill in Wetlands permit. While the Commission may choose to take up the issue of Indirect or Cumulative Impacts in the future, and that may encompass statewide zoning, such impacts may not be tied to a Dredge and Fill in Wetlands permit.

Thus, it is my thought that we should deal Secondary Impacts in our definition.

I realize that we are assuming, as noted by one of the commissioners, that all Secondary Impacts are "adverse" impacts. As Matt Schweisberg noted in his presentation, it is difficult to see, except in rare instances or unless it is a mitigation project, where Secondary Impacts are not adverse. While we can define Secondary Adverse Impacts, this seems like a little too much word-smithing, and I would suggest we stick with the term Secondary Impacts.

Secondary Impacts

It is my opinion that all of the definitions we have seen to date are too general. Under 40 CFR 230.10 (c): "No discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the Waters of the U.S….." But what is "significant degradation"?

The term "reasonably foreseeable" is not only to be found in HB 222, but is also in the Washington DOT document supplied by Representative Gottling. It is an action that is considered "likely to occur" and isn't too "speculative". Again, I don't think that we can base a definition on something that is so general.

My suggestion to the subcommittee is that we focus first on defining the functions that can be impacted (Secondary Impacts) by a project, and then define parameters that would result in "significant" degradation.

With regard to a list of functions, I would suggest the following, based upon the ACOE Highway Methodology Supplement:

1- Groundwater Recharge/Discharge
2- Floodflow Alteration (Storage & Desynchronization)
3- Fish and Shellfish Habitat
4- Sediment/Toxicant/Pathogen Retention
5- Nutrient Removal/Retention/Transformation
6- Production Export (Nutrient)
7- Sediment/Shoreline Stabilization
8- Wildlife Habitat
9- Recreation (Consumptive and Non-Consumptive)
10- Education/Scientific Value
11- Uniqueness/Heritage
12- Visual Quality/Aesthetics
13- Threatened or Endangered Species Habitat

There are numerous other lists of wetland functions and values. We could also consider the functions listed in the Method for the Comparative Evaluation of Nontidal Wetlands in New Hampshire (not that I am suggesting we ignore tidal wetlands, but that we can use the same functions):

1- Ecological Integrity
2- Wetland Wildlife Habitat
3- Finfish Habitat for Watercourses Associated with Wetland
4- Education Potential
5- Visual/Aesthetic Quality
6- Water-Based Recreation in Watercourse Associated with Wetland
7- Flood Control Potential
8- Ground Water Use Potential

9- Sediment Trapping
10- Nutrient Attenuation
11- Shoreline Anchoring and Dissipation of Erosive Forces
12- Urban Quality of Life
13- Historical Site Potential
14- Noteworthiness

I certainly recognize that some of these functions we may not wish to consider, such as Visual Quality/Aesthetics, as it may be very difficult to quantify. Some of these functions we, as a subcommittee, may just wish to not consider.

We could also simplify the list of functions, or draw them completely from Chapter 482-A:1 Finding of Public Purpose, which includes the terms "protect and preserve"… "from despoliation and unregulated alteration, "which"will adversely affect the value of such areas as":

1- Sources of nutrients for finfish, crustacean, shellfish, and wildlife of significant value.
2- Habitats and reproduction areas for plants, fish and wildlife of importance.
3- Commerce, recreation and aesthetic enjoyment of the public.
4- Adequate groundwater levels.
5- Stream channels and their ability to handle runoff of waters.
6- Natural ability of wetland to absorb floodwaters and silt, thus increasing general flood damage and the silting of open water channels.
7- Interests of the general public.

So, first order of business is:

1- In this first round of definitions, are we going to define "Secondary Impacts"?
2- In defining "Secondary Impacts" (if we agree that is what we are going to define first), what functions do we wish to consider?
3- In order to make a definition, will we use set parameters to define when secondary impacts are present?

To give an example of number 3, consider the presence of vernal pools, especially those having 40 or more egg masses. Perhaps any land grading activity within 250 feet of such a resource should be considered a secondary impact.

Another example might be runoff from paved surfaces. Perhaps any runoff that is not treated to remove 80% or more of silt, pollutants, nutrients, hydrocarbons, etc. will be considered a secondary impact.

Obviously, I am not suggesting how the project addresses these secondary impacts, but only that the above might qualify in our matrix of parameters that defines what is a secondary impact.

I would like your comments on this approach.

Is it rationale?

Is it supportable?

Do we have enough information, between the members of the subcommittee, to be able to generate the parameters?

If we choose to go this route, then our next task will be to pick a function, and work on the parameters that define secondary impacts to that function.

I would suggest (if we all agree on this approach ----- which I know is quite an assumption) that we tackle water quality and those functions that depend on retaining good water quality. I believe that we can effectively create parameters that can address water quality better than some of the other functions.

Thanks.
Jim

HB 1574 Commission to Study Land Development …..
Definitions Subcommittee
3-29-09
Comments prepared by JP Gove (Chair), for Members: Erin Darrow, Laura Deming, Peter Stanley, and Peter Walker

Based upon a meeting of the subcommittee on 3-16-09, attended by Erin Darrow, Laura Deming, Peter Stanley and Jim Gove, the following business was conducted:

Answers to Questions Posed:

1- In this first round of definitions, are we going to define "Secondary Impacts"?

The answer is "yes", we will define only "Secondary Impacts", and leave the definitions of "Indirect Impacts" and "Cumulative Impacts" for another time.

2- In defining "Secondary Impacts", what functions do we wish to consider?

The primary functions can be broken down into three broad categories:
A – Water Quality
B – Water Quantity
C – Wildlife

There was also the concept of taking the three functions/values lists (ACOE Highway Methodology Supplement (AC-HM), Method for the Comparative Evaluation of Nontidal Wetlands in New Hampshire (NH-M), and Chapter 482-A:1 Finding of Public Purpose (C482)) and make our own list of functions and values that fit under the three broad categories, and "discard" those functions/values that fall outside of the categories (for the purposes of the definition of "Secondary Impacts").

Thus a breakdown of the functions/values under the three broad categories would be something like the following, with references to origin:

Water Quality

Sediment/Toxicant/Pathogen Retention	AC-HM
Nutrient Removal/Retention/Transformation	AC-HM
Production Export (Nutrient)	AC-HM
Sediment/Shoreline Stabilization	AC-HM
Sediment Trapping	NH-M
Nutrient Attenuation	NH-M
Shoreline Anchoring and Dissipation of Erosive Forces	NH-M
Sources of nutrients for finfish, crustacean, shellfish, and wildlife of importance	C482
Natural ability of wetlands to absorb silt	C482

Water Quantity	
Groundwater Recharge/Discharge	AC-HM
Floodflow Alteration (Storage & Desynchronization)	AC-HM
Flood Control Potential	NH-M
Ground Water Use Potential	NH-M
Adequate groundwater levels	C482
Stream channel's ability to handle runoff of waters	C482
Natural ability of wetland to absorb floodwaters and not increase general flood damage	C482
Wildlife	
Fish and Shellfish Habitat	AC-HM
Wildlife Habitat	AC-HM
Threatened or Endangered Species Habitat	AC-HM
Ecological Integrity	NH-M
Wetland Wildlife Habitat	NH-M
Finfish Habitat for Watercourses Associated with Wetlands	NH-M
Habitats and reproduction areas for plants, fish, and wildlife of importance	C482
"Discarded" Functions/Values	
Recreation (Consumptive and Non-Consumptive	AC-HM
Education/Scientific Value	AC-HM
Uniqueness/Heritage	AC-HM
Visual Quality/Aesthetics	AC-HM
Education Potential	NH-M
Visual/Aesthetic Quality	NH-M
Water-Based Recreation in Watercourse Associated with Wetland	NH-M
Urban Quality of Life	NH-M
Historical Site Potential	NH-M
Noteworthiness	NH-M
Commerce, recreation and aesthetic enjoyment of the public	C482
Interests of the general public	C482

There is obvious overlap or duplication from the various lists of functions/values. The following is an attempt to condense the sub-functions under the three broad categories:

Water Quality	
Sediment/Shoreline Stabilization	AC-HM
Sediment Trapping	NH-M
Nutrient Attenuation	NH-M
Production Export (Nutrient)	AC-HM
Duplicate Water Quality Functions/Values	
Sediment/Toxicant/Pathogen Retention	AC-HM
Nutrient Removal/Retention/Transformation	AC-HM
Shoreline Anchoring …….	NH-M
Sources of nutrients for finfish, …..	C482
Natural ability of wetlands to absorb silt	C482
Water Quantity	
Flood Control Potential	NH-M
Groundwater Recharge/Discharge	AC-HM
Duplicate Water Quantity Functions/Values	
Floodflow Alteration (Storage ….)	AC-HM
Ground Water Use Potential	NH-M
Adequate groundwater levels	C482
Stream …handle runoff of waters	C482
Natural ability …absorb floodwaters ….	C482
Wildlife	
Fish and Shellfish Habitat	AC-HM
Wildlife Habitat	AC-HM
Threatened or Endangered Species Habitat	AC-HM
Duplicate Wildlife Functions/Values	
Ecological Integrity	NH-M
Wetland Wildlife Habitat	NH-M
Finfish Habitat for ……	NH-M
Habitats and reproduction areas …..	C482

The above provides a consolidated list of the functions/values to be considered in the definition of “Secondary Impacts”.

The third question posed was:

3- In order to make a definition, will we use set parameters to define when secondary impacts are present?

The answer was “yes”, we should use set parameters to define when secondary impacts are present from a proposed project.

One of the suggestions made was to present both the concept of primary broad categories of functions/values to the Commission to receive feedback, and second, show a project where the three broad categories were involved and how they were addressed.

J. Gove agreed to present the Manchester Housing and Redevelopment Corporation's Northwest Business Park, Hackett Hill Road, Manchester, NH. This will be a PowerPoint presentation that will note the issues of water quality, water quantity and wildlife, and the techniques used to address the concerns.

The intent is to provide a demonstration of methodologies that can be used to address the secondary impacts of a project.

Final comments from the subcommittee were that the approach of a matrix of parameters that define secondary impacts is rationale, supportable, but, there will be required assistance beyond the subcommittee to generate the parameters. Perhaps departments at DES can provide assistance.

As documented in the previous notes of 3-2-09, the next step will be to pick a primary category of function/value and work of the parameters that define secondary impacts to that category.

As noted before, Water Quality may be the first function/value to attempt definition.

Thanks,
Jim

DRAFT

Meeting Minutes for 6-5-09
Meeting of the Definitions Subcommittee with Representatives of NH Fish & Game and NH DES at the Conference Room of NH Fish & Game
Prepared by Jim Gove

Attendees:

Jim Gove	AGC of NH	jgove@gesinc.biz
Paul Currier	NHDES	paul.currier@des.nh.gov
Mary Ann Tilton	NHDES	mtilton@des.state.nh.us
Charlie Bridges	NHFG	charles.bridges@wildlife.nh.gov
John Kanter	NHFG	john.kanter@wildlife.nh.gov
Lori Sommer	NHDES	lori.sommer@des.nh.gov
Mike Marchand	NHFG	Michael.Marchand@wildlife.nh.gov
John Doran	NHAR	jdoran@comcast.net / 566-9921
Chuck Miner	NHFG	Charles.r.miner@wildlife.nh.gov
Sue Gottling	NH House, RR&D Comm	sgottling@comcast.net
Steve Weber	NHFG	sweber@nh.gov
Peter Stanley	NH Assoc RPCs	zoning@nl-nh.gov

Gove made presentation giving the history of the commission and the direction that is being taken to define secondary impacts. Comments and observations as best I was able to record (and I apologize to all for what I missed or mangled) are as follows:

Mike Marchand – Why is the Commission using only wetlands, when there should be a broad landscape approach?

Paul Currier – A 300-foot buffer to all wetland and water bodies would meet all water quality standards, but does not leave much land left.

Peter Stanley – The Commission is using wetlands and wildlife setbacks as a practical approach.

Sue Gottling – Using wetlands is a start and will address HB 222. NH does not have an overall environmental policy act.

Mike Marchand – The wetland approach may be okay for short-term but not for long-term.

Lori Sommer – This approach using wetland would be something like the shoreland protection act. Low value wetland have less setback, and high value wetlands have more setback.

Gove/Stanley – To address the values of wetlands, we like the NH Method.

Sue Gottling – We need a method of valuing the wetlands. The difficult part is the question of what do with a wetland that ranks either one under a cut off value or one over a cut off value. The system needs to add professional judgment to determine if the wetland value should be modified to fit the correct ranking..

Steve Weber – We don't know where all the endangered species are located.

Lori Sommer – There has been an update to the NH Method and DES can get the Commission a copy. DES has been working with Amanda Stone, and "new" NH Method appears ready to be field tested.

Mary Ann Tilton – The "new" NH Method need to be field tested and used in conjunction with Wildlife Action Plan (WAP).. There is also a program developed by Scott Jackson that evaluates wetlands at a landscape level, and is used on important wildlife areas in MA. There is a grant in process to have similar analysis tool in NH.

Paul Currier – The water quality standards and the anti-degradation policy must be maintained to protect water quality. The difficultly is quantification of the standards in this context.

John Doran – How do you come up with the numbers?

Paul Currier – DES needs a rapid assessment system, like the NH Method. DES also has available the Macro Invertebrate Index which is very good at determining if a stream is good or has been completely trashed. Section 401 of the Clean Water Act gives the state power to ask what is the impact to water quality. Under an SPGP, Section 401 is automatic. We need to pick numbers with what we have available for data, even if it is not complete.

Mike Marchand – There are some positive aspects to the approach that is being proposed. Currently F&G will look at all resources on site, all wetland functions and what habitats that are connected. But this is not happening on small sites. F&G needs to look at the NH Method new version to see if it can address some of the habitat resource issues that are being missed on small sites. I have a concern with some TE (Threatened/Endangered) species not linked to wetlands. Hognose snakes in gravel pits are an example that may be neglected. Very few TE species live in wetlands only.

Sue Gottling – It is part of our charge to cover TE species.

Peter Stanley – We still need to have an assessment tool that everyone can use. Let's change the NH Method to cover TE species.

Charlie Bridges – Agencies prefer not to deal with developers, and developers prefer not to deal with agencies. Upfront pro-active analysis will lead to avoidance of wetlands and

proximity effects. At F&G, we have the staff to analyze the impacts to resources, but have two issues: do not have the money and must respect land owner rights.

John Doran – Can some sort of inventory be created on a broad basis? Developers would perceive that any type of onsite analysis as an obstacle and would find a broad base inventory more valuable. Developers need to understand what and why something is valuable. While F&G may do an assessment, there is a need to respect the property rights for protection.

Charlie Bridges – The F&G needs to have the ability for the information to be public.

Sue Gottling – We are not looking for the accumulation of information. The Commission is looking for long term standards that will provide a valuation system for wetlands. If a project comes up, there needs to be a consistent way of evaluating the impact to the wetlands..

Paul Currier – We need to have a streamlined process, and we are not that far away.

Charlie Bridges – It would be helpful to have natural resource planning for communities to understand what might be a good site for development but might not be a good for TE species. WAP is one tool that can be used to direct communities. We need to keep in mind that all TE species locations are not known. The F&G has no regulatory authority and only is part of a DES process. We can't tell people what to do. We may have information on what will impact TE species, but F&G may not have distances for setbacks. We need to look a holistically to see if proximity approach will work in general. We also want to keep common species common, because once they become TE species, they may never come back as viable communites.

Steve Weber – To have F&G involved, we need to look at public resources under RSA 91A. A possible start would be the process of classifying wetlands by the NH Method and would it provide an inventory of habitat resources? F&G needs to review this possibility and look at issues.

Mike Marchand – We have limited knowledge of TE species, but over time information will be upgraded. In absence of information, the NHB check is there. The check provides "a high likelihood" of a species being present, but it is not a certainty. NH has no certification process for wildlife discipline, so there might be misses of species if you have analysis done by less qualified consultants. Some of these TE species are hard to find.

Sue Gottling – We need a consistent approach. We are not looking to stop projects and not a cut off of work. We are looking at a process to evaluate the wetlands and determine if they are affected by the project. This process would have the complexity of the shoreland bill.

Paul Currier – We have some of this in place. Cold water fisheries need a certain amount of stream cover. But we are not saying that you can't cut the trees. It becomes a decision as to if you want trout or not have trout.

John Doran – When is the quality such that it would trigger an inventory? "Likely to have" is an inexact term that is difficult for the developer. Speaking on behalf of some of the membership, why is it even important?

Sue Gottling – We need to have an inventory at the start of the process.

Paul Currier – It needs to be based on science.

Mike Marchand – There are models that can be done, science-based, that will be predictive.

Steve Weber – When you take the step out of the water, terrestrial wildlife is much more difficult to predict.

Mike Marchand – It is really tough to find some of these TE species. "Likely to have" is about the best we can do right now.

John Doran – Some of my membership may question why we even care about TE species.

Lori Sommer – DES needs to get information out to communities and public about the value of TE species, like a circuit rider approach.

Peter Stanley – We need wildlife including TE species for the quality of NH life. It is why people come to NH.

Sue Gottling – We need to have consistent standards for all communities, which will also help the developer.

Peter Stanley – Everyone should have similar approach.

John Doran – Consistency would be good.

John Kanter – It is a positive step in having this discussion. Ideally, everything should not hinge on wetlands. Pine Barrens are not protected by anything. However, the NH Method makes a lot of sense. Also, there is a need for education and to upgrade the consultants to become proficient in identification of TE species.

Mary Ann Tilton – We have an upgrade on the NH Method.

Chuck Miner – We need to provide education to John Doran's group.

Conclusions:

1- DES to get new NH Method to F&G and Land Use Commission to evaluate.
2- F&G to evaluate classification by NH Method for habitat proximity effects.
3- Paul Currier look at NH Method for water quality proximity effects.
4- Peter Stanley offering New London as a test area for new NH Method.
5- Lori Sommer will separate out on the NH Method the wildlife sections from the water quality/quantity sections.
6- Sue Gottling :
    a. Review the "new" NH Method to see if it will provide numerical divisions.
    b. Numerical Divisions – assign the divisions such that three or four classes of wetlands are identified.
    c. Numerical Setbacks – assign proximity distances for each of the classes of wetlands.
    d. Statewide Standards – develop legislation that codifies the method, classes and distances.

August 7th at F&G (9-11) a meeting with the above to review findings and prepare report of August Land Use Commission.

1 New Section; Impact Assessment. Amend RSA 482-A by inserting after section 3 the following new section:

RSA 482-A: 3-a Impact Assessments

I. In determining whether to approve or deny an application, the department shall assess the impact to the functional values of wetlands and aquatic resources enumerated in RSA 482-A: 1 caused by the construction or post-construction operations of the proposed project. The department shall assess both the direct impacts and indirect impacts of a proposed project as follows:
   (a) The assessment will only take place if a project has a direct wetland impact.
   (b) With the exception of those project excluded pursuant to RSA 482-A: 3-a, II, the department shall assess the impact to the functional values of wetlands and aquatic resources caused by the construction and post construction operations of those portions of the project proposed to be located in a buffer area adjacent to wetlands or aquatic resources.
   (c) The width of the buffer area shall range from 0 to 100 feet, dependent upon the functional values provided by the wetland.
   (d) There shall be no buffer adjacent to man-made areas such as roadside ditches, detention basins, drainage structures, treatment swales, treatment wetland, dug ponds, and stormwater best management practices.

II. The following activities and project types shall be excluded from the requirements set forth in this section relative to the assessment of indirect impacts
   (a) Agriculture performed in accordance with best management practices;
   (b) Forestry conducted in compliance with RSA 227-J: 9 and best management practices;
   (c) Public utility maintenance activities conducted in accordance with best management practices;
   (d) Projects subject to permitting-by-notification; and
   (e) Minimum Impact Projects that do not require an Alteration of Terrain Permit.
   (f) Wetland buffers shall not apply to areas regulated by the Comprehensive Shoreland Protection Act.
   (g) Wetland buffers shall not apply to tidal areas or to prime wetlands.

III. No later than twelve months after the effective date of this section, the department shall adopt rules setting forth the methodology for determining the width of the buffer adjacent to a specific wetland or aquatic resource.

IV. For all applications not otherwise exempt, the applicant shall demonstrate that potential impacts have been avoided to the extent practicable, that any unavoidable impacts have been minimized, and that appropriate compensatory mitigation measures have been provided for in accordance with rules adopted by the department.

V. Nothing in this section shall be construed to require a dredge and fill permit, or a wetlands impact assessment, for project occurring entirely outside of areas subject to the department's jurisdiction under this chapter.

Legislative Land Use Commission Definitions Subcommittee
Meeting of 1-11-10 at LOB 305
11:05 AM to 12:45 PM

Attendees:

Chuck Miner (was present for ½ the meeting)
John Doran
Paul Morin
Peter Stanley
Collis Adams (for Rene Pelletier)
Sue Gottling
Jim Gove

Members not in attendance:

Erin Darrow
Peter Walker

Asked to be removed from subcommittee:

Laura Deming

Item 1: In discussing impacts to uplands adjacent to wetlands, the terms "secondary" and "indirect" seem to be used interchangeably. To clarify which term the Subcommittee should be using, it was put to a vote and the unanimous decision was to use the term "indirect".

Item 2: In discussing the concept of negative impacts to wetlands from indirect activities, the general wording of this concept was addressed: "It is very likely that negative impacts due to indirect activities will occur to some wetlands and not to others. Not all indirect impacts will have a detrimental effect on all wetlands. Not all wetlands need to be protected from indirect impacts." This concept was voted on unanimously.

Item 3: In discussing the concept of using functions and values to identify those wetlands that might need protection from indirect impacts, it was agreed that a numeric evaluation method should be used. Therefore, the Army Corps of Engineers Highway Methodology would not be the preferred evaluation system. Other than the NH Method (revised), there appear to be no other methods of evaluation that would provide a numeric ranking.

It was noted that RSA 482-A does not use the term functions, only values. However, the subcommittee agreed that it was the functions of the wetland, not the values of the wetland (as defined by the NH Method) that would be used to evaluate a wetland. It was also agreed that the NH Method (revised) would be the best tool to evaluate the functions and to provide a ranking of wetlands. It was agreed that only certain functions should be used to evaluate the wetlands. The subcommittee agreed unanimously that sound science via the NH Method was to be used to evaluate the certain functions of a wetland to determine its priority for protection.

Therefore, some wetlands will have a low numeric ranking for the certain functions, and will not be provided any protection from activities taking place in the uplands adjacent to the wetland. Other wetlands that have a high numeric ranking for the certain functions would be provided protection from indirect impacts.

Item 4: In discussing the question if RSA 482-A was the appropriate legislative vehicle for addressing indirect impacts, the subcommittee felt this should be left open. It was agreed that all the charges for the Land Use Commission could not fit under RSA 482-A. However, there was a concern that the creation of a new statute would result in another permit to be obtained by the landowner. It was generally agreed that while some aspects of indirect impacts could be part of RSA 482-A, others could not.

As an example, the issue of corridor and habitat fragmentation for predominantly upland species (deer or hognose snake), could not be addressed under RSA 482-A. There for, some parts of indirect impacts could be addressed as an expansion of RSA 482-A. With regard to all indirect impacts, it was agreed by the subcommittee to leave the legislative vehicle as an open question.

Item 5: There were no other methods than the NH Method that the subcommittee knew of that would provide a numeric ranking for the certain wetland functions. It was agreed in a previous session that the revised NH Method would be used.

Item 6: With regard to “best professional judgment”, the subcommittee at earlier sessions had determined that this was not a sound science method of evaluating wetlands.

Item 7: At this meeting, the subcommittee did not pick the certain wetland functions as identified by the NH Method (revised). At previous meetings, the general functions of water quality, water quantity and wildlife habitat were viewed to be the most important for the determination of indirect impact.

Item 8: It is important to have a sound science basis for creating a numeric ranking of wetlands to determine which need protection from secondary impacts. Only the NH Method (revised) provides that, as opposed to a function only being present (as by the Army Corps Methodology).

Item 9: The subcommittee has chosen to focus on the NH Method (revised) and not to search for other functional assessment tools.

Item 10: The subcommittee agreed that the NH Method (revised) would be used to provide a numeric ranking of wetland, and that numeric ranking would determine which wetlands needed to be protected from indirect impacts. However, once the wetland was identified as needing protection from indirect impacts, it was suggested a matrix be used to determine the spatial buffer from the activity to wetland.

Item 11: The primary function that is both most measurable and for which a matrix can be developed is water quality. Using existing data from DES, the scientific literature, and other sources; it was suggested that a matrix could be developed by the subcommittee that would determine a spatial buffer. Sample elements of the matrix might be landscape, slope, soils, vegetation, etc. The matrix would provide a buffer width. This buffer could be reduced if certain stormwater practices were put in place.

Item 12: While wildlife cannot be ignored, it was recognized that there are many variables, such a species present or predicted, that could have a variety of answers for buffer widths. It was recognized that any buffer would have some benefit to wildlife. It may not be possible, however, to create a matrix with all the variables (at this time due to our knowledge base) to provide a recommended buffer width for all circumstances.

Item 13: By focusing primarily on water quality, the subcommittee can utilize existing literature to develop a workable matrix.

Item 14: There was a review of the Table of Contents for the Comprehensive Shoreland Protection Act to use as a guide for the elements of an indirect impacts statue.

While it does not appear that the "Finding of Public Purpose" under Chapter 482-A would need to be re-written, it does appear, based upon the subcommittee's comments, that some clarification would be needed. For instance, 482-A:1 talks about values. An addition would be that the need for a wetland to be protected from indirect impacts would be determined by certain functions that the wetland exhibits.

Exemptions would need to be added, such that certain types of wetland would automatically not be subject to functional assessment, as well as, certain types or categories of activities.

If the exemptions did not apply, then the wetlands on the site would be evaluated for certain functions and a numeric rank would be generated for each wetland. The level of that numeric rank would determine which wetlands would be protected from indirect impacts.

The information of the elements of the upland around the wetland would be parameters for the matrix that would determine the buffer width. Certain BMPs could be utilized by the activity to reduce the buffer width, as well as a waiver process to reduce the buffer width.

Future work for the subcommittee:

1- Develop language for the "Finding of Public Purpose".
2- Review the NH Method (revised) and determine which functions should be evaluated.

3- Determine what would be exempted from analysis of indirect impacts, both what wetland types and what activities.
4- Develop a matrix for buffer widths.
5- Determine the buffer widths.
6- Determine the BMPs and waivers that would reduce the buffer widths.

Next meeting of the subcommittee:

February 8th, 2010, Monday, at 11 AM, at LOB 305.

RSA 482

Definitions

Wetland Buffers – An area of upland adjacent to a wetland intended to protect the wetland from indirect impacts resulting from activities in the upland that degrade the wetland values enumerated in RSA 482-A:1.

Indirect Impacts – A change to one or more of the values of a wetland enumerated in RSA 482-A:1 resulting from activities in an adjacent upland. Not all indirect impacts will have a detrimental effect on all wetlands.

Section 482-A:34
Evaluating Wetlands for Wetland Buffers
The Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire (2009) shall be used to determine the values of a wetland. Those values shall be determined by assessing the functions that the wetland performs resulting in a numerical score. Wetlands that have a numeric score exceeding the thresholds listed below for stormwater functions and/or wildlife habitat functions shall have a wetland buffer. Those wetlands that do not have a numeric score exceeding the thresholds listed below for stormwater functions and/or wildlife habitat functions shall not be required to have a wetland buffer.

Exemptions – Wetlands – The following wetlands are exempted from evaluation and assessment for a wetland buffer:

Man-made ditches
Man-made water conveyance structures
Man-made ponds other than those created as compensatory mitigation
Retention/detention ponds
All Low Impact Development measures that are not created for wildlife habitat
Stormwater treatment wetlands
Stormwater treatment swales
Man-made wash ponds in aggregate industries

Exempt Activities – The following activities are exempted from evaluation and assessment for a wetland buffer:

Agriculture
Forestry
Activities regulated under the Comprehensive Shoreland Protection Act
Activities in or within 100 feet of a Prime Wetland (regulated under RSA 482-A
Activities in or within 100 feet Tidal Wetlands (regulated under RSA 482-A
Activities for the management of areas, which restrict wildlife for public safety, such as areas around airports.

Public utility maintenance activities conducted in accordance with best management practices.
Stormwater best management practices
Activities subject to permitting-by-notification (DES Wetlands to check on)
(Other??)

Determination of Wetland Buffer – The wetland shall be evaluated using the Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire (2009). The wetland shall be numerically scored assessing the following functions:

Group 1 – Wildlife Habitat
- Ecological Integrity
- Wetland-Dependant Wildlife Habitat
- Fish and Aquatic Life Habitat
- Noteworthiness

Group 2- Stormwater Control and Renovation
- Flood Storage
- Ground Water Interaction
- Sediment Trapping
- Nutrient Trapping/Retention/Transformation

If the functions listed under Group 1 have a combined aggregate numerical score of X, the wetland shall have a wetland buffer of 100 feet in width.

If the functions listed Under Group 2 have a combined aggregate numerical score of Y, the wetland shall have a wetland buffer on 50 feet in width.

Exceptions – Threatened or Endangered Species – If a wetland is found to contain a threatened or endangered species, the wetland buffer shall be evaluated by the department and modified based upon scientific ecological data if a take of the species is determined.

Wetland Buffer Vegetation Criteria – The wetland buffer vegetation shall be maintained as a natural woodland buffer.

Wetland Buffer Modification – The department may consider wetland buffer modification if so requested by the applicant. If the department determines that for the ecological benefit of the wetland protected by a wetland buffer, and meets the project purpose of the applicant, that some areas of the wetland buffer may be narrower, and some areas will be wider, the commissioner shall have the authority to grant buffer modification requests.

Mitigation of the Wetland Buffer – If the applicant can demonstrate that mitigation can be provided that shall have the same ecological and functional equivalent of the wetland buffer, the commissioner shall have the authority to grant variances from the minimum standards of this section.

Above language is the result of a Definitions Subcommittee Meeting of 4-9-10, attended by Collis Adams, Representative Sue Gottling, Peter Stanley, John Doran, Paul Morin and Jim Gove.

Wetland Buffers Draft

Amend RSA 482-A by inserting after section 4 the following new section:

482-A:4-a Wetland Buffers.

I. Except as provided in paragraph VII, for any project or activity that requires a permit under this chapter, the wetlands associated with the project or activity shall be evaluated and scored using the Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire as published by the University of New Hampshire Cooperative Extension in 2010. Numeric scores shall be determined for the following wetland functions as identified in the document, which shall be grouped as indicated:

(a) Group 1 – ecological integrity, wetland-dependant wildlife habitat, fish and aquatic life habitat, and noteworthiness;

(b) Group 2 – flood storage, ground water interaction, sediment trapping, and nutrient trapping/retention/transformation.

II. If the functions in group 1 have a combined numeric score of X or above, the associated wetland shall have a wetland buffer of 100 feet in width. If that is not the case, then if the functions in group 2 have a combined numeric score of Y or above, the associated wetland shall have a wetland buffer of 50 feet in width. If that is not the case, then there shall be no wetland buffer.

III. If a wetland contains a threatened or endangered species, the department shall evaluate the adequacy of any associated wetland buffer to protect such species and may modify the size of the buffer based upon scientific, ecological data if a take of the species is determined. *{Is "take" the proper term? What does it mean here?}*

IV. The department, at the request of an applicant, may narrow one or more areas of a wetland buffer, provided others are widened, if the department determines that doing so provides an ecological benefit to the wetland being protected and meets the project purpose of the applicant.

V. Any wetland buffer established shall be maintained as a natural woodland buffer.

VI. The department may provide a variance to the requirements of this section if the applicant demonstrates that mitigating actions can be taken that would result in an equivalent or

increased level of ecological protection as compared to what would otherwise be required by this section.

VII. This section shall not apply to the following:

(a) Man-made ditches;

(b) Man-made water conveyance structures;

(c) Man-made ponds other than those created as compensatory mitigation;

(d) Retention/detention ponds;

(e) Low impact development measures that are not created for wildlife habitat;

(f) Stormwater treatment wetlands;

(g) Stormwater treatment swales;

(h) Man-made wash ponds in aggregate industries;

(i) Agriculture and forestry activities;

(j) Activities regulated under RSA 483-B, the comprehensive shoreland protection act;

(k) Activities within 100 feet of a prime wetland;

(l) Activities within 100 feet of the highest observable tide line;

(m) Activities for the management of areas to deter wildlife for public safety purposes, such as areas around airports;

(n) Public utility maintenance activities conducted in accordance with best management practices; *{Any specific document such as Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire published by DRED (see RSA 482-A:3, XV)}*

(o) Stormwater best management practices; and *{Is this well defined/understood?}*

(p) Activities subject to permit-by-notification (DES Wetlands to check on)

(Other??)

REVISED PER 5-17-2010 COMMENTS

For presentation at the May 17, 2010 meeting of the HB 1579 Commission to Study Land Development Regulations and Effects of Land Development Within Upland Areas That May Affect Wetlands and Surface Waters of the State.

Prepared by Jim Gove, Chairman of the Definitions Subcommittee

~~**(Text Below: Prepared by the Definitions Subcommittee on 4-9-10)**~~

RSA 482

Definitions

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Indirect Impacts – A change to one or more of the values of a wetland enumerated in RSA 482-A:1 resulting from activities in an adjacent upland. Not all indirect impacts will have a detrimental effect on all wetlands.

~~**(Text Below: Prepared by Joel Anderson for the Definitions Subcommittee based upon a meeting of 5-3-10)**~~
~~**(Bolded text is changes by Jim Gove based upon meeting with the Definitions Subcommittee and the NH Method Working Group on 5-13-10)**~~

Amend RSA 482-A by inserting after section 4 the following new section:

482-A:4-a Wetland Buffers.

I. Except as provided in paragraph VII, for any project or activity that requires a permit under ~~this~~ chapter 482 or 485, the wetlands ~~associated with~~ on the project ~~or activity~~ shall be evaluated and scored using the Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire as published by the University of New Hampshire Cooperative Extension in 2010. The evaluation shall be prepared by a NH

Certified Wetland Scientist. Numeric scores shall be determined for the following wetland functions as identified in the document, which shall be grouped as indicated:

(a) Group 1 – ecological integrity, wetland-dependant wildlife habitat, and fish and aquatic life habitats;

(b) Group 2 – flood storage, ground water interaction, sediment trapping, and nutrient trapping/retention/transformation.

(c) Group 3 – noteworthiness

The function of ecological integrity shall be evaluated to determine if the score exceeds ##.
The function of wetland-dependant wildlife habitat shall be evaluated to determine if the score exceeds ##.
The function of fish and aquatic life habitat shall be evaluated to determine if the score exceeds ##.
The function of flood storage shall be evaluated to determine if the score exceeds ##.
The function of ground water interaction shall be evaluated to determine if the score exceeds ##.
The function of sediment trapping shall be evaluated to determine if the score exceeds ##.
The function of nutrient trapping/retention/transformation shall be evaluated to determine if the score exceeds ##.
The function of noteworthiness shall be evaluated to determine if the function is present.

~~**(The following is Joel Anderson's wording with modifications by Jim Gove)**~~

II. If any of the functions in group 1 have exceeded the numeric score, the associated wetland shall have a wetland buffer of 100 feet in width. If that is not the case, then if any of the functions in group 2 have exceeded the numeric score, the associated wetland shall have a wetland buffer of 50 feet in width. If that is not the case, then there shall be no wetland buffer, with the exception of paragraph III.

III. If a wetland has a function of noteworthiness, the department shall evaluate the adequacy of a~~ny associated~~ wetland buffer to protect the wetland and may modify the size of the buffer based upon scientific ecological data.

IV. The department, at the request of an applicant, may narrow one or more areas of a wetland buffer, provided others are widened, if the department determines that doing

so provides an ecological benefit to the wetland being protected and meets the project purpose of the applicant.

V. Any wetland buffer established shall be maintained in its current state or allowed to naturally vegetate. ~~as a natural woodland buffer~~.

VI. The department may provide relief ~~a variance~~ to the requirements of this section if the applicant demonstrates that mitigating actions can be taken that would result in an equivalent or increased level of ecological protection as compared to what would otherwise be required by this section. The mitigating measures shall only be considered after the applicant has demonstrated avoidance and minimization with regard to encroachments into a wetland buffer.

VII. There will be no buffer~~This section shall not apply to~~ to the following wetlands:

(a) Man-made ditches;

(b) Man-made water conveyance structures;

(c) Man-made ponds other than those created as compensatory mitigation;

(d) Retention/detention ponds;

(e) Low impact development measures that are not created for wildlife habitat;

(f) Stormwater treatment wetlands;

(g) Stormwater treatment swales;

(h) ~~(h)~~ Man-made wash ponds in aggregate industries;

VIII. The provisions of this section will not apply to the following activites:

(a)~~(i)~~ Agriculture meeting Best Management Practices

(b)~~and~~ F~~f~~orestry activities meeting Best Management Practices;

~~(~~c~~j)~~ Activities regulated under RSA 483-B, the comprehensive shoreland protection act;

(d~~k~~) Activities within 100 feet of a prime wetland;

(e~~l~~) Activities within 100 feet of the highest observable tide line;

(f~~m~~) Activities for the management of areas to deter wildlife for public safety purposes, such as areas around airports;

(gn) Public utility maintenance activities conducted in accordance with ~~best management practices; {Any specific document such as~~ *Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire published by DRED (see RSA 482-A:3, XV~~)~~}*

(ho) Stormwater best management practices; ~~and {Is this well defined/understood?}~~

(ip) Activities subject to permit-by-notification ~~(DES Wetlands to check on)~~

~~(Original text by Joel Anderson on May 5, 2010)~~

~~Wetland Buffers Draft~~

~~Amend RSA 482-A by inserting after section 4 the following new section:~~

~~482-A:4-a Wetland Buffers.~~

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~~{Is "take" the proper term? What does it mean here?}~~

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~~(g) Stormwater treatment swales;~~

~~(h) Man-made wash ponds in aggregate industries;~~

~~(i) Agriculture and forestry activities;~~

~~(j) Activities regulated under RSA 483-B, the comprehensive shoreland protection act;~~

~~(k) Activities within 100 feet of a prime wetland;~~

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~~(o) Stormwater best management practices; and *{Is this well defined/understood?}*~~

~~(p) Activities subject to permit-by-notification (DES Wetlands to check on)~~

~~(Other??)~~

REVISED PER 6-8-105-17-2010 COMMENTS
For presentation at the May 17, 2010 meeting of the HB 1579 Commission to Study Land Development Regulations and Effects of Land Development Within Upland Areas That May Affect Wetlands and Surface Waters of the State.

Prepared by Jim Gove, Chairman of the Definitions Subcommittee

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Amend RSA 482-A by inserting after section 4 the following new section:

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~~**(c) Group 3 – noteworthiness**~~

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The function of nutrient trapping/retention/transformation shall be evaluated to determine if the score exceeds ##.
~~**The function of noteworthiness shall be evaluated to determine if the function is present.**~~

II. If any of the functions in group 1 have exceeded the numeric score, the associated wetland shall have a wetland buffer of 100 feet in width. If that is not the case, then if any of the functions in group 2 have exceeded the numeric score, the associated wetland shall have a wetland buffer of 50 feet in width. If that is not the case, then there shall be no wetland buffer.~~,~~ ~~with the exception of paragraph III.~~

~~**III. If a wetland has a function of noteworthiness, the department shall evaluate the adequacy of a wetland buffer to protect the wetland and may modify the size of the buffer based upon scientific ecological data.**~~

IV. The department, at the request of an applicant, may narrow one or more areas of a wetland buffer, provided others are widened, if the department determines that doing so provides an ecological benefit to the wetland being protected and meets the project purpose of the applicant.

V. Any wetland buffer established shall be ~~maintained in its current state or~~ allowed to naturally vegetate. .

VI. The department may provide relief to the requirements of this section if the applicant demonstrates that mitigating actions can be taken that would result in an equivalent or increased level of ecological protection as compared to what would otherwise be required by this section. The mitigating measures shall only be considered after the applicant has demonstrated avoidance and minimization with regard to encroachments into a wetland buffer.

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~~(e) Low impact development measures that are not created for wildlife habitat;~~

~~(f) Stormwater treatment wetlands;~~

~~(g) Stormwater treatment swales;~~

(h) ~~Man-made wash ponds in aggregate industries;~~ (above will become non-jurisdictional)

VIII. The provisions of this section will not apply to the following activities:

(a) Agriculture meeting Best Management Practices

(b)Forestry activities meeting Best Management Practices;

c Activities regulated under RSA 483-B, the comprehensive shoreland protection act;

(d) Activities within 100 feet of a prime wetland;

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(g) Public utility maintenance activities conducted in accordance with *Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire published by DRED (see RSA 482-A:3, XV}*

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Amend RSA 482-A by inserting after section 4 the following new section:

482-A:4-a Wetland Buffers.

I. Except as provided in paragraph VII, for any project or activity that requires a permit under chapter 482 or 485, any wetland within 100 feet of any clearing, disturbance or structure shall be evaluated and scored using the Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire as published by the University of New Hampshire Cooperative Extension in 2010. A NH Certified Wetland Scientist shall prepare the evaluation. Wetlands on site will be evaluated in the field. Wetlands on abutting properties will be evaluated by remote sensing. Numeric scores shall be determined for the following wetland functions as identified in the document, which shall be grouped as indicated:

(a) Group 1 – ecological integrity, wetland-dependant wildlife habitat, and fish and aquatic life habitats;

(b) Group 2 – flood storage, ground water interaction, sediment trapping, and nutrient trapping/retention/transformation.

The function of ecological integrity shall be evaluated to determine if the score exceeds ##.
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The function of fish and aquatic life habitat shall be evaluated to determine if the score exceeds ##.
The function of flood storage shall be evaluated to determine if the score exceeds ##.
The function of ground water interaction shall be evaluated to determine if the score exceeds ##.

The function of sediment trapping shall be evaluated to determine if the score exceeds ##. The function of nutrient trapping/retention/transformation shall be evaluated to determine if the score exceeds ##.

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V. Any wetland buffer established shall be allowed to naturally vegetate. .

VI. The department may provide relief to the requirements of this section if the applicant demonstrates that mitigating actions can be taken that would result in an equivalent or increased level of ecological protection as compared to what would otherwise be required by this section. The mitigating measures shall only be considered after the applicant has demonstrated avoidance and minimization with regard to encroachments into a wetland buffer.

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(f) Activities for the management of areas to deter wildlife for public safety purposes, such as areas around airports;

(g) Public utility maintenance activities conducted in accordance with *Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire published by DRED (see RSA 482-A: 3, XV}*

(h) Stormwater best management practices;

(i) Activities subject to permit-by-notification

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

Summary of Scores

FUNCTION	SCORE
1. Ecological Integrity	8.0
2. Wetland-Dependent Wildlife Habitat	6.9
3. Fish & Aquatic Habitat	6.5
4. Scenic Quality	9.3
5. Educational Potential	6.2
6. Wetland-Based Recreation	5.4
7. Floodwater Storage	7.1
8. Groundwater	1.0
9. Sediment Trapping	6.5
10. Nutrient Removal / Retention / Transformation	7.7
11. Shoreline Anchoring	8.3
12. Noteworthiness	40.0

Narrative Description

Foss Meadow is a marsh & shrub wetland of approximately 57 acres. It is located in the upper part of the Little Suncook River Watershed, at the eastern base of Nottingham Mountain in Deerfield. The wetland's watershed is 750 acres and is largely forested and undeveloped.

The wetland is influenced by beaver activity and was in the path of the July, 2008 tornado, which has had an impact in the 500 ft zone around approximately half the wetland. Wetland vegetation classes observed in the wetland include: Palustrine Emergent (PEM1), Palustrine Scrub Shrub (PSS1), Palustrine Unconsolidated Open Bottom – Open Water (PUB), and Palustrine Forested (PFO1 & PFO5). Dominant plant species observed in the wetland included a variety of herbaceous emergent plants. The soils in the wetland were mapped by NRCS as 97 - Greenwood and Ossipee, ponded water. One stream (Griffin Brook) flows through the wetland, which includes approximately 9 acres of open water.

ECOLOGICAL INTEGRITY

The ecological integrity of Foss Meadows is moderately high. Water quality in the wetland appears high, and there is no evidence of fill or other human disturbance. However, logging in the upland adjacent to the wetland and in parts of the wetland) following the 2008 tornado has created some potential short term erosion. Within 500 ft of the wetland, the upland is largely undisturbed (one town road and no buildings) The wetland's outlet is an abandoned beaver dam, resulting in lower water levels than in recent years.

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

WETLAND-DEPENDENT WILDLIFE HABITAT

The fifth largest wetland in town, Foss Meadow has significant wildlife habitat value. Approximately 10% of the wetland is open water, supporting species such as waterfowl. A stream flows through the wetland and there are four different wetland vegetation classes (PEM, PSS, PUB, PSS). Other wetlands nearby increase the value of wetland habitat in the area.

FISH AND AQUATIC HABITAT

Habitat for fish and aquatic life is favored by the extensive marsh & shrub habitats but is limited by the amount of open water and perennial stream habitat ~~there~~. Contributing to habitat value are a largely forested watershed, high water quality a diversity of substrate types in the wetland and associated stream, abundant cover materials (wood and large rocks) and the absence of artificial barriers. Blanding's turtle, an endangered species in NH, has been reported in the vicinity of Foss Meadow (personal communication with a local resident and Phil Auger, UNHCE).

SCENIC QUALITY

Foss Meadow is a particularly scenic wetland, with an open view across it to Nottingham Mountain from Griffin Road. This view from the road is temporary, however, resulting from logging following the 2008 tornado. A similar view will remain available from other parts of the wetland edge even after the logged area re-grows. Much of the wetland's open marsh & shrub habitat, is presently visible from the road. Nottingham Mountain creates a high degree of-landscape contrast. Diversity of vegetation in and around the wetland and its generally natural appearance enhance its scenic value.

EDUCATIONAL POTENTIAL

Foss Meadow has moderate educational potential. Favoring educational use are the wetland's unspoiled character, wildlife habitat and scenic values, several wetland vegetation types, open water and a stream. Public access is not formally guaranteed (such as through a conservation easement), but the land is not posted against entry and physical access is not difficult. The wetland is close to a public road with modest parking. There is no disabled access.

WETLAND-BASED RECREATION

Foss Meadow has opportunities for wildlife observation, access to a stream and the wetland's scenic quality. Limited parking, lack of disabled access and no guaranteed public access are limiting factors.

FLOODWATER STORAGE

Foss Meadow's floodwater capacity is moderate to high. The wetland is relatively large in relation to its watershed (about 7.5%) enabling it to hold a large amount of water produced by the watershed during times of high flow.

GROUNDWATER

This function scored low for Foss Meadow. There is no stratified drift aquifer near the wetland, no potential public water supply area nearby and limited groundwater recharge potential (dominant soil types within 500 ft of the wetland are 140 C&D and they are not highly permeable).

SEDIMENT TRAPPING

The sediment trapping function of Foss Meadow is moderate, due to a moderate to high Wetland Flood Index, an outlet that is not constricted or blocked, a relatively straight stream channel and some ponded open water with limited sediment removal capacity. Contributing to the sediment trapping function are the moderate gradient of the wetland's watershed, dense emergent wetland vegetation and relatively shallow water depth.

NUTRIENT REMOVAL/ RETENTION/TRANSFORMATION

The wetland has a moderate ability to attenuate nutrients. Contributing to this function are the Wetland Flood Index, dense emergent wetland vegetation and sediment trapping capacity. Other factors are a seasonally saturated/flooded and semi-permanently flooded hydrology and very poorly drained wetland soils that support year-round nutrient attenuation. The relatively shallow water depth adds to the wetland's capacity for this function.

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

SHORELINE ANCHORING

Foss Meadow has a moderate shoreline anchoring capacity, a function of two wetland vegetation types along the shoreline (emergent & shrub), high vegetation density and a wide wetland area bordering the stream.

NOTEWORTHINESS

Foss Meadows has several noteworthy feature, including a Critical Habitat (Marsh & Shrub Wetland) and Highest Ranked Habitat in about half the wetland (state and regional significance), as described in the NH Wildlife Action Plan, local significance because it is the 5th largest wetland in town, and regional significance because it is located in a priority area in Bear-Paw Regional Greenways Conservation Plan and is one of the larger wetlands in the region

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

1 – ECOLOGICAL INTEGRITY

Evaluation Questions	Observations &Notes	Answers	Score
1. Has water quality in the wetland been degraded by land use **in the wetland's watershed**?	*Logging and associated stream/wet area crossings following the 2008 tornado have created sources of sediment on one side of the wetland.*	a. No sediment or nutrient sources in the subwatershed b. Some (1-2 sources) sediment or nutrient sources in the subwatershed c. Many (more than 3 sources) nutrient sources in the subwatershed	10 5 1
2. Is there evidence of fill **in the wetland**?	*One stream crossing at south end of wetland.*	a. Less than 1 % b. From 1-3 % c. More than 3 %	10 5 1
3. What percentage **of the wetland** has been altered by agricultural activities?	*None*	a. Less than 5 % b. From 5 to 25 % c. More than 25 %	10 5 1
4. What percentage **of the wetland** has been adversely impacted by logging activity within the last 10 years?	*See note for question 1*	a. Less than 1% b. From 1 to 10 % c. More than 10 %	10 5 1
5. How much human activity is taking place **in the wetland** (e.g. ATV use, trails, cars, dumping of brush and garbage, etc.)?	*None evident*	a. Low: Few trails in use, little or no traffic, and little or no litter. b. Moderate: Some used trails, roads, litter c. High: Many trails, roads, and/or litter	10 5 1
6. What percentage **of the wetland** is occupied by invasive plant species?	*None observed but clearing noted in question 1 could lead to introduction of invasives. Should be monitored annually.*	a. Less than 5% b. From 5 to 30% c. More than 30%	10 5 1
7. How many times does a road, driveway, and/or railroad cross or border the wetland?	*A logging road does*	a. None *b.* One c. Two or more	10 5 1
8. How much human activity is taking place **in the upland** within 500 feet of the wetland edge?	*Griffin Road is within 500 ft. of the wetland*	a. Low: Little or no activity b. Moderate: some activity evident c. High: Much activity evident.	10 5 1
9. How many buildings are there within 500 feet of the wetland edge? *Acres of Wetland* *# of buildings*	*None, though there are several within 700 ft.*	a. More than 50 wetland acres per building b. 11-50 wetland acres per building c. Less than 10 wetland acres per bldg	10 5 1
10. Is there a human-made structure that controls water level, or is undersized, present in the wetland or in the water body directly connected to the wetland?	*No, but the beaver dam that controlled the water level for decades has been unmaintained recently and water level is somewhat lower.*	a. No human-made structures present b. Bridge or large culvert >10 ft across is present and is not clogged. c. Culvert is less than 10 ft across, and existing structure is clogged, has failed or is not maintained, or road crossing with no culvert d. No stream present	10 5 1 0

AVERAGE SCORE FOR ECOLOGICAL INTEGRITY)

(Add scores for each question and divide by 10) **8.0**

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

2 – WETLAND-DEPENDENT WILDLIFE HABITAT

Evaluation Questions	Observations & Notes	Answers	Score
1. What is the wetland acreage?	*57 acres (NWI polygons total from GRANIT Data Mapper) Recorded as 78 acres in 1992 evaluation, using NWI & grid method*	a. More than 100 acres b. From 20 - 100 acres c. Less than 20 acres	10 5 1
2. What is the score for Ecological Integrity?	*Logging and associated stream/wet area crossings following the 2008 tornado have created sources of sediment on one side of the wetland.*	Average score for Functional 1	7.5
3. Has water quality in the wetland been degraded by land use **in the watershed**?		Record Answer from **Ecological Integrity**, Question 3	10
4. What is the area of shallow permanent open water less than 6.6 feet deep, including streams and shallow ponds that are part of the wetland complex?	*7.9 acres of PUB (GRANIT Data Mapper)*	a. More than 3 acres b. From 0.5 to 3 acres c. Less than 0.5 acre	10 5 1
5. Is there deepwater habitat (lakes or ponds >6.6ft deep) and/or 4th order or higher rivers associated with the wetland?	*No*	a. Deepwater stream ≥1 mile long and/or lake or pond ≥10 acres present b. Deepwater stream < 1 mile long and/or lake or pond < 10 acres present c. No deepwater stream, lake or pond present	10 5 1
6. What is the diversity of vegetation classes in the wetland?	*PUB, PEM, PSS, PFO (GRANIT Data Mapper)*	a. Three or more wetland classes (including islands) present b. Two wetland classes (including islands) present c. One wetland class present	10 5 1
7. Are other wetlands in close proximity to the study wetland?	*Yes, one larger (16.6 acres) & one smaller (0.2) acres) one are within 0.25 miles.*	a. Other connected or unconnected wetlands within a 0.25 mile distance b. Wetland connected to other wetlands within a 0.5 to 1 mile distance by perennial stream or lake, **OR** other unconnected wetlands are present within a 0.25 to 0.5 mile distance c. Wetland not hydrologically connected to other wetlands within 1 mile and more than 0.5 miles from other unconnected wetlands.	10 5 1

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

2 – WETLAND-DEPENDENT WILDLIFE HABITAT (continued)

Evaluation Questions	Observations & Notes	Answers	Score
8. Are there wildlife travel corridors allowing access to other wetlands?	*Griffin Rd. James Rd & houses along them constitute barriers to animal movement.*	a. Free access along well vegetated stream corridor, woodland, or lakeshore b. Access partially blocked by roads, urban areas, or other obstructions c. Access blocked by roads, urban areas, or other obstructions	10 5 1
9. What percentage of the wetland edge is bordered by undisturbed woodland or idle land (e.g. shrub land or abandoned fields) at least 500 feet in width?	*Estimated > 90% is bordered by natural land cover, within 500 ft., though about half the wetland edge was cleared following the 2008 tornado. Griffin Rd. is within 500 ft. of the wetland at one point, thus the >90% estimate.*	a. More than 95% of the wetland b. More than 75-95% of the wetland c. Less than 75% of the wetland	10 5 1
10. What percentage of the wetland is occupied by invasive plant species?	*None observed.*	Record Answer from **Ecological Integrity**, Question 6	10

AVERAGE SCORE FOR WILDLIFE HABITAT
(Add scores for each question and divide by 10) 6.9

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

3 – FISH AND AQUATIC HABITAT

Evaluation Questions	Observations & Notes	Answers	Score
1. What is the dominant land use in watershed above wetland.	*Mostly wooded*	a. Woodland, wetland, or abandoned farmland b. Active farmland or rural residential c. Urban and heavily developed suburban areas	10 5 1
2. Has water quality in the wetland been degraded by land use **in the watershed**?	*Logging and associated stream/wet area crossings following the 2008 tornado have created sources of sediment on one side of the wetland.*	Record Answer from **Ecological Integrity**, Question 1	5
3. What is the area of shallow permanent open water less than 6.6 ft deep, including streams and ponds within the wetland?	*7.9 acres of PUB (GRANIT Data Mapper)*	Record Answer from **Wetland-Depeendent Wildlife Habitat**, Question 4	10
4. What is the acreage of deepwater habitats deeper than 6.6 feet (pond or lake) associated with the wetland?	*None*	a. More than 100 acres b. From 10 to 100 acres c. Less than 10 acres d. deepwater pond or lake not present	10 5 1 0
5. What is the width (bank-to-bank) of the stream associated with the wetland?	*Est. 20 ft. average.*	a. More than 50 feet b. From 25 to 50 feet c. From 2 to 25 feet d. Less than 2 feet e. No stream present	10 7 5 1 0
6. Does the stream channel appear to have been recently altered?	*Channel appears natural*	a. Stream is in a natural channel, either a meandering low gradient stream, **OR** a steeper gradient stream with pools and riffles b. Portions of stream appear recently modified, **OR** stream formerly channelized but has regained some natural channel features c. Stream appears to have been recently been channelized, **OR** stream is confined in a non-vegetated chute or pipe d. No stream present	10 5 1 0
7. What is the diversity of substrate types in a wetland in the area(s) occupied by open water for the non-growing season?	*Difficult to observe directly. Observations done from location on near beaver dam. This is mostly an informed guess.*	a. 4 or more substrate types b. 2 or 3 substrate types c. 1 substrate type	10 5 1
8. How abundant are coarse woody material and large rocks?	*Tornado caused many dead tree trunks to fall, so downed logs are abundant in parts of the wetland.*	a. Moderately Abundant to Abundant: More than 10% of water area contains cover objects such as logs, stumps, branches and rocks b. Scarce: Less than 10% of the water area contains cover objects c. No visible woody materials or rocks d. Open water not present	10 5 1 0

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

Evaluation Questions	Observations & Notes	Answers	Score
9. What is the abundance of floating & submerged vegetation	*Date of Observation: May 15 Need to recheck during growing season*	a. Abundant: More than 70% of water area contains cover objects such as pond lilies, pondweed, and bladderwort b. Moderately abundant: From 30 to 70% of water area contains floating and submerged vegetation c. Scarce: Less than 30% of the water area contains floating and submerged vegetation d. Open water not present	10 5 1 0
10. Are there barriers to the passage of aquatic life (such as dams, elevated culverts, bridge with a width less than the natural stream channel, road crossings, etc. along the stream reach associated with the wetland).		a. No barrier(s) present. b. An artificial barrier is present and equipped with a fish ladder or other provisions for fish passage, or artificial barrier is only present during extreme low water c. Dam, elevated culverts or other artificial barrier(s) is present without provisions for fish passage d. Stream not present	10 5 1 0
11. Are rare or endangered fish or aquatic life present?	*Blanding's turtle reported from vicinity (personal communication with nearby landowner and Phil Auger, UNHCE.*	a. Documented occurrence of a rare or endangered fish or aquatic life species within or immediately adjacent to the subject wetland b. Documented occurrence of a rare or endangered fish or aquatic life species within .5 miles of wetland **and** suitable habitat exists for this species within the wetland c. No documented occurrence of a rare or endangered fish or aquatic life species within .5 miles of wetland, but suitable habitat exists and wetland is within range of one or more rare species d. No documented occurrence of a rare or endangered fish or aquatic life species within .5 miles of wetland, and suitable habitat is not known to exist	10 5 1 0

AVERAGE SCORE FOR FISH & AQUATIC LIFE HABITAT –
(Add scores for each question and divide by 10) 6.5

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

Location of scenic viewing area: **From Griffin Rd**

4 – SCENIC QUALITY

Evaluation Questions	Observations & Notes	Answers	Score
1. How many wetland vegetation classes are visible from primary viewing location(s)?	*PUB, PEM, PSS, PFO (GRANIT Data Mapper)*	a. Three or more classes b. Two classes c. One class	10 5 1
2. Is there public access at viewing site?	*Not posted against access but public access not guaranteed. Road view is a result of clearing following 2008 tornado and view will disappear over time as trees re-grow.*	a. Viewing site is on a property with public access, and trails to the site, or is viewed from a road. b. Wetland is on property with public access but no trails to the site. c. Wetland is on a property that does not have public access.	10 5 0
3. What is the visible extent across the wetland?	*See note for previous question.*	a. Large expanse visible and low growing plants, or mixed classes you can see through b. View is somewhat restricted by trees and shrubs c. Forested wetland with little or no expanse visible.	10 5 1
4. What is the approximate extent of open water and streams visible from primary viewing location/s?	*Estimated10 acres including stream*	a. More than 3 acres of open water and/or stream b. From 1 to 3 acres of open water and/or stream c. Less than 1 acre of open water and/or stream	10 5 1
5. Does the wetland provide visual contrast with surrounding landforms?	*Yes – Nottingham Mountain is the backdrop to the west.*	a. High level of visual contrast with surrounding natural landscape. b. Some visual contrast with surrounding natural landscape c. Little visual contrast with surrounding landscape, or surrounding landscape is developed	10 5 1
6. What is the diversity of vegetation types in the viewshed that flower or provide fall color?	*Mountain & hillsides wih various tree species & shrubs on wetland edge.*	a. High level of visual diversity b. Moderate level of visual diversity c. Low level or no visual diversity	10 5 1
7. What is the general appearance of the wetland and surrounding land use(s) visible from primary viewing location(s)?	*Logging effects remain – ruts, stumps. etc.*	a. Wetland is undisturbed and natural. No visual detractors, such as buildings, litter, abandoned cars, or powerlines b. Limited disturbance in and/or around wetland. Minor visual detractors c. Severe visual detractors present	10 5 1

AVERAGE SCORE FOR SCENIC QUALITY

(Add scores for each question and divide by 7) **9.3**

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

Location of potential education area: **East side of wetland, accessed from Griffin Rd**

5 – EDUCATIONAL POTENTIAL

Evaluation Questions	Observations & Notes	Answers	Score
1. What is the Ecological Integrity of the wetland?		Average Score from 1- Ecological Integrity	7.5
2. Does the wetland have high value wildlife habitat?		Average Score from 2 – Wetland-dependent Wildlife Habitat	6.9
3. Is all or part of the wetland on public or private property that has public access?	*Not posted against access but public access not guaranteed. Road view is a result of clearing following 2008 tornado and view will disappear over time as trees re-grow.*	a. Wetland is on a property with public or private access and trails to the site. b. Wetland is on a property with public or private access but no trails to the site. c. Wetland is on a property that does not have public access.	10 5 1
4. How close is the educational site to off-road parking suitable for 10-15 vehicles and large enough for a school bus?	*But not formally open to the public.*	a. Adequate parking is available less than 5 minutes from the educational site. b. Adequate parking is 10-15 min.walk from educational site, or parking is limited. c. Adequate parking is more than 15 mins walk from the educational site, or no adequate parking is available.	10 5 1
5. How many wetland vegetation classes are accessible or potentially accessible for study at the potential educational site/s?	*PUB, PEM, PSS, PFO (GRANIT Data Mapper)*	a. Three or more wetland vegetation classes b. Two wetland vegetation classes c. One wetland vegetation class	10 5 1
6. Is there access to a perennial stream or pond associated with the wetland at educational site?	*Stream present, though difficult to access due to wetland around it.*	a. Direct access to water available b. Water access is a short distance (5 mins or less) from the educational site c. Perennial stream or pond not present, or access not feasible	10 5 1
7. What is the aesthetic and visual quality of the potential educational site?		Average Score from 4 – Scenic Quality	9.3
8. Is the educational site accessible to the disabled?	*No*	a. Yes b. No	10 0

AVERAGE SCORE FOR EDUCATIONAL POTENTIAL

(Add scores for each question and divide by 8) **6.2**

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

Location of potential recreational site: **East side of wetland**

6 – WETLAND-BASED RECREATION (CANOEING, KAYAKING, AND WILDLIFE OBSERVATION)

Evaluation Questions	Observations & Notes	Answers	Score
1. Are there opportunities for wildlife observation?	*Yes.*	Average score for **2 – Wetland-Dependent Wildlife Habitat**	6.9
2. Is there access to suitable open water for canoes and kayaks?	*Limited open water & difficult access*	a. Open water is present, with easy access b. Open water is present, but site is not easily accessed for canoes/kayaks. c. No open water and no access	10 5 1
3. Are there hiking, fishing and hunting opportunities?		a. Maintained trails are present in and immediately adjacent to the wetland b. Trails are present but not maintained c. No trails are present	10 5 1
4. Is there off-road public parking at potential recreation site for at least two cars?	*But not formally open to the public.*	a. Adequate parking is available less than 5 minutes from the recreation site. b. Adequate parking is a 5-10 minute walk from the recreation site, or parking is limited. c. Adequate parking is more than 10 minutes walk from the recreation site, or no adequate parking is available.	10 5 1
5. What is the scenic quality of the potential recreational site?		Average score from **4 – Scenic Quality**	9.3

AVERAGE SCORE FOR WATER-BASED RECREATION
(Add scores for each question and divide by 4) **5.4**

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

7 –FLOODWATER STORAGE

NOTE: Instead of manually calculating the Wetland Flood Index on this data sheet, you can use the Flood Index Worksheet, an Excel spreadsheet provided on the NHM website, which is set up to do all the calculations for you. An example of the spreadsheet is provided in Table 3.

In the following situations, the Flood Value Index does not need to be calculated for the wetland being studied. Instead a certain flood index range can be assumed:

1. Wetlands with slopes greater than 10% (10' vertical :100' horizontal) as measured along the flow path, where it is obvious that little flood attenuation could occur, **should be assigned a Low Flood Index Value range (0.0 to 1.0).**
2. For large ponds or lakes or wetlands greater than 200 acres and streams that are Fourth Order or higher (i.e. 4th, 5th, 6th etc.) **assign a High Flood Index Value range (7.6 to 10.0)**

Evaluation Questions	Observations and Notes	Answers	Factor
1. Determine Wetland Acreage (**W**)	*Used transparent grid method to estimate watershed size. (1/2 " grids on 1:12,000 scale map (GDM)*	750 acres	
2. Determine Watershed Acreage (**S**)	*From NWI polygons, GRANIT Data Mapper*	57 acres	
3. Water Storage Depth (**D**)	*Default*	a. Assign a default value of 1.0 ft if the actual water storage depth is not known b. Use the actual water storage depth if known	**D**=1.0 ft **D**= __ ft
4. Wetland Storage Volume (**V**)		Multiply Water Storage Depth by Wetland acreage: D x A = V	**V**= 57 acre feet
5. Wetland Storage Volume Factor (**F**)		Insert value from Table 1	**F**= ___
6. Watershed Area Factor (**A**)		Insert value from Table 2	**A**= 0.88 (extrap-olated)
7. Location of wetland within the watershed (**L**)	*The wetland has a first order stream entering and discharging from it. It becomes second order within 1000 ft. of leaving the wetland.*	a. Wetland located within 1,000 ft of a 4th order or higher stream or a pond/lake that outlets to a 4th order or higher stream. b. Wetland located within 500 ft of a perennial stream c. Wetland located > 1,000 ft from a 4th order or higher stream	1.0 0.8 0.6

SCORE FOR WETLAND FLOOD INDEX = F x A x L x 10 0.81 x 0.88 x 1.0 x 10 = **7.1**

= Moderate to High Flood Value

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

Table 1

Wetland Storage Volume factor (F)

Wetland Storage volume (V)	Value for F
≥ 200	1.000
150	0.950
100	0.900
75	0.850
50	0.800
37.5	0.750
25	0.700
18.75	0.650
12.5	0.600
9.375	0.550
6.25	0.500
4.69	0.450
3.125	0.400
2.36	0.350
1.6	0.300
1.2	0.250
0.8	0.200
0.6	0.150
0.4	0.100
0.3	0.075
0.2	0.050
0.15	0.037
0.1	0.025
0.5	0.012
0	0.000

Table 2

Watershed Area factor (A)

Value for P: Wetl. Area/Wshed Area x 100	Value for A
≥10%	1.00
9%	0.95
8%	0.90
7%	0.85
6%	0.80
5%	0.75
4%	0.70
3%	0.65
2%	0.60
1%	0.55
< 1%	0.50

EXAMPLES OF WETLAND FLOOD INDEX CALCULATION:

Example 1: *(See Wetland I.D. 1 in spreadsheet)*
Wetland Area (W) = 0.25 acres
Watershed Area (S) = 25 acres
Water Storage Depth (D) = 0.5 ft (known depth)
Water Storage Volume (V) = 0.5 ft x 0.25 acres = 0.125 acre-feet
Wetland Storage Volume Factor (F) = 0.03 (from Table 1)
Watershed Area Factor (A) = 0.55 (from Table 2, where 0.25 acres/25 acres x 100 = 1%)
Location in Watershed (L) = 0.8 (middle one-third)
Wetland Flood Index = 0.03 x 0.55 x 0.80 = 0.0132 **Flood Value Type = Low Flood Value**

Example 2: *(see Wetland I.D. W3 in spreadsheet)*
Wetland Area (W) = 33 acres
Watershed Area (S) = 17,937 acres
Water Storage Depth (D)= 1.0 ft (default value)
Water Storage Volume (V) = 1.0 ft x 33 acres = 33 acre-feet
Wetland Storage Volume Factor (F) = 0.73 (from Table 1)
Watershed Area Factor (A) = 0.5 (from Table 2, where 33 acres/17,937 acres x 100 = 0.18%)
Location in Watershed (L)= 1.0 (lower one-third)
Wetland Flood Index ValueType = 0.73 x 0.5 x 1.0 = 3.65 **Flood Value = Moderate Flood Value**

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

Table 3: Example of Flood Index Worksheet
(Refer to the Excel spreadsheet that calculates the Flood Water Storage Index)

Date: 2/10/2009 (Mike Leo) Reformatted 6/9/09 (Amanda Stone)

WFV = (V x Afx L) x 10

Where:

Maximum Wetland Storage Volume = 200 acre-ft

Maxiumum Wetland Flood Function Value = 10

"Red" headings indicate data input columns

"Black" headings indicate columns where the figures are automatically calculated

Wetland I.D.	Wetland Acreage (acres) (W)	Watershed Acreage (S)	Wetland Area as % of Watershed (P) from Table 2	Watershed Area Factor (A) Table 2	Location in Watershed (L) (1.0/0.8/0.6)	Water Storage Depth (D) feet 1.0 = default	Wetland Storage Volume (V) acre feet	Wetland Storage Volume Factor (F) Table 1	Flood Index
1	0.25	25	1.00	0.55	0.8	0.5	0.125	0.03	**0.132**
2	0.75	15	5.00	0.75	1	1	0.75	0.19	**1.425**
3	2	50	4.00	0.7	0.8	2.5	5	0.46	**2.576**
4	10	100	10.00	1	1	3	30	0.72	**7.200**
5	10	1000	1.00	1	1	4	40	0.77	**7.700**
6	3	47	6.38	0.81	0.8	2	6	0.48	**3.110**
7	0.1	3	3.33	0.42	0.6	0.5	0.05	0.016	**0.040**
8	0.75	20	3.75	0.68	0.6	0.15	0.1125	0.027	**0.110**
9	1	50	2.00	0.6	1	2.5	2.5	0.35	**2.100**
10	50	400	12.50	1	0.8	3	150	0.95	**7.600**
			#DIV/0!				0	0	**0.000**
W1	283	19548	1.45	0.57	1	1	283	1	**5.700**
W3	33	17937	0.18	0.5	1	1	33	0.73	**3.650**
W4	54	17291	0.31	0.5	1	1	54	0.73	**3.650**
W5	202	16619	1.22	0.56	1	1	202	1	**5.600**
W6	175	2664	6.57	0.82	1	1	175	0.95	**7.790**
W7	40	446	8.97	0.94	1	1	40	0.78	**7.332**
W8	24	380	6.32	0.51	1	1	24	0.69	**3.519**
W9	43	679	6.33	0.51	1	1	43	0.77	**3.927**
W10	116	2161	5.37	0.77	1	1	116	0.92	**7.084**
W11	63	880	7.16	0.86	1	1	63	0.83	**7.138**
W12	24	3302	0.73	0.86	1	1	24	0.69	**5.934**
			#DIV/0!				0	0	**0.000**
ND1	93.7	5169	1.81	0.57	1	1		0.88	**5.016**
ND2	50	3741	1.34	0.57	1	1	50	0.8	**4.560**
ND3	37	258	14.34	1	1	1	37	0.75	**7.500**
ND4	101	2700	3.74	0.68	1	1	101	0.9	**6.120**
ND5	110.5	562	19.66	1	1	1	110.5	0.92	**9.200**
ND6	99	1753	5.65	0.77	1	1	99	0.9	**6.930**

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

Note that this function does not require any field work

Evaluation Questions	Observations & Notes	Answers	Score
1. Does the wetland overlie stratified drift aquifer?		a. Wetland overlies stratified drift aquifer b. Wetland is adjacent to stratified drift aquifer c. Wetland is not located over or adjacent to stratified drift aquifer	10 5 1
2. Is the wetland in a potential public water supply area?		a. Wetland is in an area identified by Favorable Gravel Well Analysis b. Wetland is directly adjacent to an area identified by Favorable Gravel Well Analysis c. Wetland is not located in or adjacent to an area identified by Favorable Gravel Well Analysis	10 5 1
3. What is the dominant soil type within 500 ft of the wetland?	*140 C&D are dominant soil types around wetland (GRANIT Data Mapper)*	a. More than 50% of the soil types within 500 ft of the wetland are on the list in Table 3. b. 25-50% of the soil types within 500 ft of the wetland are listed in Table 3 c. Less than 25% of the soil types within 500 ft of the wetland are listed in Table 3	10 5 1

AVERAGE SCORE FOR GROUND WATER
(Add scores for each question and divide by 3) **1.0**

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

9 – SEDIMENT TRAPPING

Evaluation Questions	Observations &Notes	Answers	Score
1 What is the wetland's Flood Storage value?		Average score from 7 – Flood Water Storage.	7.1
2 Does the wetland lack an outlet or have a constricted outlet?		a. Wetland has no outlet. b. Wetland has constricted outlet. c. Wetland outlet not constricted or flow primarily within stream channel.	10 5 1
3. What is the shape of the stream channel through the wetland?	*Stream channel is relatively straight, though appearing natural.*	a. No stream channel evident in wetland b. Sinuous channel,. where the length of the channel is greater than the length of the wetland along the stream. c. Stream channel is straight.	10 5 1
4. What is the ratio of the wetland's size to the size of its watershed? $\frac{\text{Acres of Wetland}}{\text{Area of watershed above wetland outlet}} \times 100$	*57 acres / 750 acres = 7.6%*	a. Wetland is more than 20% of its watershed. b. Wetland is between 5 to 20% of its watershed. c. Wetland is less than 5% of its watershed.	10 5 1
5. What is the gradient within the wetland?	*730 ft –724 ft = 6 ft (Google Earth)* *6 / 3,888 ft wetland length = **0.15%***	a. Wetland has gradient less than 1% , is permanently ponded and has no outlet b. Wetland gradient is between 1% and 3%. c. Wetland has a gradient greater than 3%.	10 5 1
6. What is the dominant wetland vegetation class during the growing season?	*PEM classes occupy about ¾ of the wetland.*	a. Persistent emergent plants (stems above surface of water of wetland) throughout the year; forested; or scrub/shrub, bogs b. Nonpersistent emergent plants (stems fall below the surface of water of wetland in the fall and during winter. c. Open Water or Aquatic Bed vegetation	10 5 1
7. What is the stem density and vegetation-water interspersion in the wetland?	*90% of wetland is not ponded, but vegetated (See question 1 above.)*	a. > 90% vegetated & stems well distributed, low interspersion, channel not well defined (J) b. 70 to 90% vegetated, stems well distributed and included within the channel if one is present (low vegetation-water interspersion). (G, H, or I) c. 21 – 50% vegetated, or if greater than 50% vegetated, vegetation does not occur in the usual flow path of surface waters (high vegetation-water interspersion with channel highly evident. (D, E or F) d. 0 – 20% vegetated (A, B or C)	10 7.5 5 1 0
8. What is the average water depth in the wetland during growing season?	*This is an estimate based on observation and vegetation.*	a. Average water depth is less than 1 foot or there is no open water b. Average water depth greater than 1 foot and less than 6.6 feet. c. Average water depth is greater than 6.6 feet	10 5 1

AVERAGE SCORE FOR SEDIMENT TRAPPING: **6.5**
(Add scores for each question and divide by 8)

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

10 – NUTRIENT REMOVAL/ RETENTION/TRANSFORMATION

Evaluation Questions	Observations &Notes	Answers	Score
1. What is the wetland's flood water storage value?		Average score from **7 – Flood Water Storage.**	7.1
2. What is the wetland's ability to trap sediments?		Average score from **9 – Sediment Trapping.**	6.5
3. What is the dominant wetland vegetation class during the growing season?	*PEM classes occupy about ¾ of the wetland.*	a. Persistent emergent; forested; or scrub/shrub, bogs b. Nonpersistent emergents or aquatic bed c. Open Water	10 5 1
4. What is the dominant hydroperiod during the growing season?	*Hydroperiods E & F (NWI) apply to approximately equal acreages.* *E = Seasonally saturated/flooded* *F = Semi-permanently Flooded*	a. Permanently flooded; intermittently exposed or semi-permanently flooded b. Seasonally Flooded or Seasonally Flooded/Saturated c. Saturated or Temporarily Flooded	10 7.5 5 1
5. What are the dominant soils within the wetland?	*Dominant wetland soil type is 97 (Greenwood & Osspiee, Ponded)*	a. Wetland is dominantly very poorly drained soils and is not a peatland. b. Wetland is predominantly poorly drained soils with leaf litter or fine sediments. c. Sand, gravel, boulders, bedrock or peatlands.	10 5 1
6. What is the average depth of water in the wetland during the growing season?	*This is an estimate based on observation and vegetation.*	Record the answer from **9-Sediment Trapping**, Question 9	5

AVERAGE SCORE FOR WATER QUALITY MAINTENANCE **7.7**
(Add scores for each question and divide by 9)

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

11 – SHORELINE ANCHORING

If there is no stream, river, lake or pond within or adjacent to the wetland, leave this Functional out of the evaluation.

Evaluation Questions	Observations & Notes	Answers	Score
1 What is the gradation of wetland vegetation types along the shoreline?	*Many trees recently removed by logging following tornado, July, 2008.*	a. Three or more wetland vegation types present (PAB, PEM, PSS or PFO) b. Two wetland vegetation types present c. One wetland vegetation type present	10 5 1
2 What is the vegetation density in the wetland bordering watercourse, lake or pond?	*Almost 100% (Observation)*	a. High: More than 90 % vegetation cover b. Moderate: From 70-90 % vegetation cover c. Low: Less than 70 % vegetation cover	10 5 1
3 How wide is the wetland bordering the watercourse, lake or pond?	*Estimated 500ft. average, using GRANIT Data Mapper Distance Measuring Tool.*	a. More than 20 feet b. From 10-20 feet c. Less than 10 feet	10 5 1

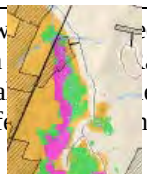
AVERAGE SCORE FOR SHORELINE ANCHORING **8.3**
(Add scores for each question and divide by 3)

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: **Sample Wetland, Deerfield, NH** Evaluation Date: **July 2, 1010** Evaluator: **Frank Mitchell**

12 – NOTEWORTHINESS

Describe noteworthy features in the wetland narrative

Evaluation Questions	Observations & Notes	Answers	Score
1. Does the wetland contain Critical Habitat (marsh and shrub wetland, and peatland) as listed in the NH Wildlife Action Plan?	*Marsh and shrub wetland shown on WAP Habitat Map.*	a. Yes	10
2. Is the w  ed in or within 500 ft of an area anked Habitat (state or regiona entified in the NH Wildlif n?	*Area of Highest Ranked Habitat t includes about half the wetland.*	a. Yes	10
3. Does the wetland have local significance because has consistently high scores for all functions and/or is among the top 25% largest wetlands in town?	*This wetland was evaluated alone as a sample, but it was evaluated in 1992 and scored a "yes" for this question when compared with other wetlands in town.*	b. Yes	10
4. Does the wetland have local or regional significance, e.g. it is located in a priority area in a local or regional conservation plan, or it is one of the largest in the region?	*Is a prioity in the Bear-Paw Regional Greenways and NH Coastal Conservation Plans*	a. Yes	10
4. Does the wetland have biological, geological, or other features which are locally rare or unique (e.g. vernal pools)?	*Blanding's turtle observed in vicinity historically.*	b. Yes	10
5. Is the wetland known to contain an important historical or archaeological site?		a. Yes	10
6. Is the wetland hydrologically connected to a state or federally designated river within ¼ mile?		a. Yes	10
7. Is the wetland one of just a few left in an urban setting?		a. Yes	10

SCORE FOR NOTEWORTHINESS **40.0**

Add up the scores for all questions which received a YES answer.
The total score is the score for this function (**note that this score is not averaged)**
For example, if you answered YES to four questions, the score would be 40.
If you answered YES to only one question, the score is 10

(Revision Date 9-14-10)
RSA 482

Definitions

Wetland Buffers – An area of upland adjacent to a wetland intended to protect the wetland from indirect impacts resulting from activities in the upland that degrade the wetland values enumerated in RSA 482-A:1.

Indirect Impacts – A change to one or more of the values of a wetland enumerated in RSA 482-A:1 resulting from activities in an adjacent upland. Not all indirect impacts will have a detrimental effect on all wetlands.

Amend RSA 482-A by inserting after section 4 the following new section:

482-A:4-a Wetland Buffers.

I. Except as provided in paragraph VII, for any project or activity that requires a permit under chapter 482 or 485, any wetland within 100 feet of any clearing, disturbance or structure shall be evaluated and scored using the Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire as published by the University of New Hampshire Cooperative Extension in 2010. A NH Certified Wetland Scientist or other qualified professional as determined by the Department shall prepare the evaluation. Wetlands on site shall be evaluated in the field. Wetlands on abutting properties may be evaluated by remote sensing. Numeric scores shall be determined for the following wetland functions as identified in the document, which shall be grouped as indicated:

(a) Category 1 – wetland-dependant wildlife habitat;

(b)Category 2 – flood storage, sediment trapping, and nutrient trapping/retention/transformation.

The function of wetland-dependant wildlife habitat shall be evaluated to determine if the score exceeds ##.
The function of flood storage shall be evaluated to determine if the score exceeds ##.
The function of sediment trapping shall be evaluated to determine if the score exceeds ##.
The function of nutrient trapping/retention/transformation shall be evaluated to determine if the score exceeds ##.

II. If any of the functions in category 1 have exceeded the numeric score, the associated wetland shall have a wetland buffer of 100 feet in width. If that is not the case, then if any of the functions in category 2 have exceeded the numeric score, the associated wetland shall have a wetland buffer of 50 feet in width. If that is not the case, then there shall be no wetland buffer unless otherwise provided by other local, state or federal law.

III. The Department may provide relief to the requirements of this section if it can be shown that a proposed action will result in an equivalent or increased level of ecological benefit to the wetland. This may include narrowing one or more areas of wetland buffer, provided others are widened, or accepting other mitigating measures.

IV. The provisions of this section will not apply to the following activities:

(a) Agriculture meeting Best Management Practices

(b) Forestry activities meeting Best Management Practices;

(c) Activities regulated under RSA 483-B, the comprehensive shoreland protection act;

(d) Activities for the management of areas to deter wildlife for public safety purposes, such as areas around airports;

(g) Public utility maintenance activities conducted in accordance with *Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire published by DRED (see RSA 482-A: 3, XV}*

(h) Stormwater best management practices;

(i) Activities subject to permit-by-notification

(Revision Date 9-14-10)
RSA 482

Definitions

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(a) Category 1 – wetland-dependant wildlife habitat;

(b)Category 2 – flood storage, sediment trapping, and nutrient trapping/retention/transformation.

The function of wetland-dependant wildlife habitat shall be evaluated to determine if the score exceeds ##.
The function of flood storage shall be evaluated to determine if the score exceeds ##.
The function of sediment trapping shall be evaluated to determine if the score exceeds ##.
The function of nutrient trapping/retention/transformation shall be evaluated to determine if the score exceeds ##.

II. If any of the functions in category 1 have exceeded the numeric score, the associated wetland shall have a wetland buffer of 100 feet in width. If that is not the case, then if any of the functions in category 2 have exceeded the numeric score, the associated wetland shall have a wetland buffer of 50 feet in width. If that is not the case, then there shall be no wetland buffer unless otherwise provided by other local, state or federal law.

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(d) Activities for the management of areas to deter wildlife for public safety purposes, such as areas around airports;

(g) Public utility maintenance activities conducted in accordance with *Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire published by DRED (see RSA 482-A: 3, XV}*

(h) Stormwater best management practices;

(i) Activities subject to permit-by-notification

Proposed Changes	
RSA 482-A Dredge & Fill	
1- All man-made wetlands, unless specifically created as compensatory mitigation for wetland impacts, shall not be considered jurisdictional wetlands. That would include all man-made ponds, all roadside ditches, all detention basins, all wetlands made specifically for stormwater treatment or control, all aggregate wash ponds, all sluice ways, etc. These areas would be removed as being wetlands under the jurisdiction of RSA 482-A.	
2- Repeal from RSA 482-A the section of Prime Wetlands. This is a bad law that is inconsistently administered and is abused by the Towns that have Prime Wetlands.	
3- Replace the Prime Wetland statute with the Land Use Commission language for wetland buffer that will only apply to the very best wetlands in the State. This can be fairly administered state-wide, allows flexibility for impacts that is not allowed by the Prime Wetlands statute, and protects the best wetlands, which was the original goal of the Prime Wetlands law.	

(Revision Date 10-1-10)
RSA 482

Amend 482-A:2 Definitions by inserting the following definitions:

Wetland Buffers – An area of upland adjacent to a wetland intended to protect the wetland from indirect impacts resulting from activities in the upland that degrade the wetland values enumerated in RSA 482-A:1.

Indirect Impacts **–** A change to one or more of the values of a wetland enumerated in RSA 482-A:1 resulting from activities in an adjacent upland. Not all indirect impacts will have a detrimental effect on all wetlands.

Amend 482-A:3 by adding the new section:

XVI. Any project or activity that requires a permit under chapter 482-A shall meet the requirements of RSA 482-A: 4-a, regarding wetland buffers, except for the following:

(a) Agriculture meeting Best Management Practices

(b) Forestry activities meeting Best Management Practices;

(c) Activities regulated under RSA 483-B, the comprehensive shoreland protection act;

(d) Activities for the management of areas to deter wildlife for public safety purposes, such as areas around airports;

(g) Public utility maintenance activities conducted in accordance with *Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire published by DRED (see RSA 482-A: 3, XV}*

(h) Activities subject to permit-by-notification

Amend RSA 482-A by inserting after section 4 the following new section:

482-A:4-a Wetland Buffers.

I. When applicable, any wetland within 100 feet of any clearing, disturbance or structure shall be evaluated and scored using the Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire as published by the University of New Hampshire Cooperative Extension in 2010. A NH Certified Wetland Scientist or other qualified professional as determined by the Department shall prepare the evaluation. Wetlands on site shall be evaluated in the field. Wetlands on abutting properties may be evaluated by remote sensing. Numeric

scores shall be determined for the following wetland functions as identified in the document, which shall be grouped as indicated:

(a) Category 1 – wetland-dependant wildlife habitat;

(b)Category 2 –sediment trapping, and nutrient trapping/retention/transformation.

The function of wetland-dependant wildlife habitat shall be evaluated to determine if the score exceeds 8.0.
The function of sediment trapping shall be evaluated to determine if the score exceeds 8.0.
The function of nutrient trapping/retention/transformation shall be evaluated to determine if the score exceeds 9.0.

II. If any of the functions in category 1 have exceeded the numeric score, the associated wetland shall have a wetland buffer of 100 feet in width. If that is not the case, then if any of the functions in category 2 have exceeded the numeric score, the associated wetland shall have a wetland buffer of 50 feet in width. If that is not the case, then there shall be no wetland buffer unless otherwise provided by other local, state or federal law. No activities shall take place in the wetland buffer that will degrade the identified function of the wetland, unless so allowed by the Department as provided in paragraph III.

III. The Department may provide relief to the requirements of this section if it can be shown that a proposed action will result in an equivalent or increased level of ecological benefit to the wetland. This may include narrowing one or more areas of wetland buffer, provided others are widened, or accepting other mitigating measures.

(Revision Date 10-19-14-10)
RSA 482

Amend 482-A:2 Definitions by inserting the following definitions

Wetland Buffers – An area of upland adjacent to a wetland intended to protect the wetland from indirect impacts resulting from activities in the upland that degrade the wetland values enumerated in RSA 482-A:1.

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Amend 482-A:3 by adding the new section:

XVI. Any project or activity that requires a permit under chapter 482-A shall meet the requirements of RSA 482-A:4-a, regardingwetland buffes, except for the following:

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(b) Forestry activities meeting Best Management Practices;

(c) Activities regulated under RSA 483-B, the comprehensive shoreland protection act;

(d) Activities for the management of areas to deter wildlife for public safety purposes, such as areas around airports;

(g) Public utility maintenance activities conducted in accordance with *Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire published by DRED (see RSA 482-A: 3, XV}*

(h) Activities subject to permit-by-notification

Amend RSA 482-A by inserting after section 4 the following new section:

482-A:4-a Wetland Buffers.

I. When applicable~~Except as provided in paragraph VII, for any project or activity that requires a permit under chapter 482 or 485~~, any wetland within 100 feet of any clearing, disturbance or structure shall be evaluated and scored using the Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire as published by the University of New Hampshire Cooperative Extension in 2010. A NH Certified Wetland Scientist or other qualified

professional as determined by the Department shall prepare the evaluation. Wetlands on site shall be evaluated in the field. Wetlands on abutting properties may be evaluated by remote sensing. Numeric scores shall be determined for the following wetland functions as identified in the document, which shall be grouped as indicated:

(a) Category 1 – wetland-dependant wildlife habitat;

(b)Category 2 – ~~flood storage,~~ sediment trapping, and nutrient trapping/retention/transformation.

The function of wetland-dependant wildlife habitat shall be evaluated to determine if the score exceeds ~~##.~~8.0.

~~**The function of flood storage shall be evaluated to determine if the score exceeds ##.**~~

The function of sediment trapping shall be evaluated to determine if the score exceeds ~~##.~~8.0.

The function of nutrient trapping/retention/transformation shall be evaluated to determine if the score exceeds ~~##.~~9.0.

II. If any of the functions in category 1 have exceeded the numeric score, the associated wetland shall have a wetland buffer of 100 feet in width. If that is not the case, then if any of the functions in category 2 have exceeded the numeric score, the associated wetland shall have a wetland buffer of 50 feet in width. If that is not the case, then there shall be no wetland buffer unless otherwise provided by other local, state or federal law. No activities shall take place in the wetland buffer that will degrade the identified function of the wetland, unless so allowed by the Department as provided in paragraph III.

III. The Department may provide relief to the requirements of this section if it can be shown that a proposed action will result in an equivalent or increased level of ecological benefit to the wetland. This may include narrowing one or more areas of wetland buffer, provided others are widened, or accepting other mitigating measures.

~~IV. The provisions of this section will not apply to the following activities:~~

~~(a) Agriculture meeting Best Management Practices~~

~~(b) Forestry activities meeting Best Management Practices;~~

~~(c) Activities regulated under RSA 483-B, the comprehensive shoreland protection act;~~

~~(d) Activities for the management of areas to deter wildlife for public safety purposes, such as areas around airports;~~

~~(g) Public utility maintenance activities conducted in accordance with *Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire published by DRED (see RSA 482-A: 3, XV)*~~

~~(h) Stormwater best management practices;~~

~~(i) Activities subject to permit-by-notification~~

(Revision Date 10-4-10)
RSA 482

Amend 482-A:2 Definitions by inserting the following definitions:

Wetland Buffers – An area of upland adjacent to a wetland intended to protect the wetland from indirect impacts resulting from activities in the upland that degrade the wetland values enumerated in RSA 482-A:1.

Indirect Impacts **–** A change to one or more of the values of a wetland enumerated in RSA 482-A:1 resulting from activities in an adjacent upland.

Amend 482-A:3 by adding the new section:

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(a) Agriculture meeting Best Management Practices

(b) Forestry activities meeting Best Management Practices;

(c) Activities for the management of areas to deter wildlife for public safety purposes, such as areas around airports;

(d) Public utility maintenance activities conducted in accordance with *Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire published by DRED (see RSA 482-A: 3, XV}*

(e) Activities subject to permit-by-notification

(f) Wetland types exempt from this section:

(1) Man-made ditches

(2) Man-made water conveyance structures

(3) Man-made ponds less than 10 acres in size, other than those created as compensatory mitigation

(4) Retention/detention ponds

(5) Created stormwater treatment wetlands

(6) Created stormwater treatment swales

(7) Man-made wash ponds in aggregate industries

(8) Low impact development measures that are not created for wildlife habitat

Amend RSA 482-A by inserting after section 4 the following new section:

482-A:4-a Regarding Wetland Buffers.

I. When applicable, any wetland within 100 feet of any clearing, disturbance or structure shall be evaluated and scored using the Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire as published by the University of New Hampshire Cooperative Extension in 2010. A NH Certified Wetland Scientist or other qualified professional as determined by the Department shall prepare the evaluation. Wetlands on site shall be evaluated in the field. Wetlands on abutting properties may be evaluated by remote sensing. Numeric scores shall be determined for the following wetland functions as identified in the document, which shall be grouped as indicated:

(a) Category 1 – ecological integrity, wetland-dependant wildlife habitat;

(b)Category 2 –sediment trapping, and nutrient trapping/retention/transformation.

The function of ecological integrity shall be evaluated to determine if the score is equal to or exceeds 8.0.
The function of wetland-dependant wildlife habitat shall be evaluated to determine if the score is equal to or exceeds 8.0.
The function of sediment trapping shall be evaluated to determine if the score is equal to or exceeds 8.0.
The function of nutrient trapping/retention/transformation shall be evaluated to determine if the score is equal to or exceeds 8.0.

II. If any of the functions in category 1 have exceeded the numeric score, the associated wetland shall have a wetland buffer of 100 feet in width. If that is not the case, then if any of the functions in category 2 have exceeded the numeric score, the associated wetland shall have a wetland buffer of 50 feet in width. If that is not the case, then there shall be no wetland buffer under this section unless otherwise provided by other local, state or federal law. No activities shall take place in the wetland buffer that will degrade the identified function of the wetland, unless so allowed by the Department as provided in paragraph III.

III. The Department may provide relief to the requirements of this section if it can be shown that a proposed action will result in an equivalent or increased level of ecological benefit to the wetland. This may include narrowing one or more areas of wetland buffer, provided others are widened, or accepting other mitigating measures.

Amend RSA 495-A:17, I, Terrain Alteration

Amend RSA 485-A:29, I, Sewage Disposal Systems

Amend RSA 483-B, Comprehensive Shoreland Protection Act

With addition of statement “and ensuring compliance with the provisions of RSA 482-A:4-a, regarding wetland buffers

(Revision Date 10-7-10)~~10-4-10)~~
RSA 482

Amend 482-A:2 Definitions by inserting the following definitions:

Wetland Buffers – An area of upland adjacent to a wetland intended to protect the wetland from indirect impacts resulting from activities in the upland that degrade the wetland values enumerated in RSA 482-A:1.

Indirect Impacts **–** A change to one or more of the values of a wetland enumerated in RSA 482-A:1 resulting from activities in an adjacent upland.

Amend 482-A:3 by adding the new section:

XVI. Any project or activity that requires a permit under chapter 482-A shall meet the requirements of RSA 482-A: 4-a, regarding wetland buffers, except for the following:

(a) Agriculture meeting Best Management Practices

(b) Forestry activities meeting Best Management Practices;

(c) Activities for the management of areas to deter wildlife for public safety purposes, such as areas around airports;

(d) Public utility maintenance activities conducted in accordance with *Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire published by DRED (see RSA 482-A: 3, XV}*

(e) Activities subject to permit-by-notification

~~(f) Wetland types exempt from this section:~~

~~(1)Man-made ditches~~

~~(2)Man-made water conveyance structures~~

~~(3)Man-made ponds less than 10 acres in size, other than those created as compensatory mitigation~~

~~(4)Retention/detention ponds~~

~~(5)Created stormwater treatment wetlands~~

~~(6)Created stormwater treatment swales~~

~~(7)Man-made wash ponds in aggregate industries~~

~~(8)Low impact development measures that are not created for wildlife habitat~~

Amend RSA 482-A by inserting after section 4 the following new section:

482-A:4-a Regarding Wetland Buffers.

I. When applicable, any wetland within 100 feet of any clearing, disturbance or structure shall be evaluated and scored using the Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire as published by the University of New Hampshire Cooperative Extension in 2010. A NH Certified Wetland Scientist or other qualified professional as determined by the Department shall prepare the evaluation. Wetlands on site shall be evaluated in the field. Wetlands on abutting properties may be evaluated by remote sensing. Numeric scores shall be determined for the following wetland functions as identified in the document, which shall be grouped as indicated:

(a) Category 1 – ecological integrity, wetland-dependant wildlife habitat;

(b)Category 2 –sediment trapping, and nutrient trapping/retention/transformation.

The function of ecological integrity shall be evaluated to determine if the score is equal to or exceeds ~~8.0~~8.5.

The function of wetland-dependant wildlife habitat shall be evaluated to determine if the score is equal to or exceeds 8.0.

The function of sediment trapping shall be evaluated to determine if the score is equal to or exceeds 8.0.

The function of nutrient trapping/retention/transformation shall be evaluated to determine if the score is equal to or exceeds ~~8.0~~8.5.

II. If any of the functions in category 1 are equal to or have exceeded the numeric score, the associated wetland shall have a wetland buffer of 100 feet in width. If that is not the case, then if any of the functions in category 2 are equal to or have exceeded the numeric score, the associated wetland shall have a wetland buffer of 50 feet in width. If that is not the case, then there shall be no wetland buffer under this section unless otherwise provided by other local, state or federal law. No activities shall take place in the wetland buffer that will degrade the identified function of the wetland, unless so allowed by the Department as provided in paragraph III.

III. The Department may provide relief to the requirements of this section if it can be shown that a proposed action will result in an equivalent or increased level of ecological benefit

to the wetland. This may include narrowing one or more areas of wetland buffer, provided others are widened, or accepting other mitigating measures.

!V Wetland types exempt from this section:

(1) Man-made ditches

(2) Man-made water conveyance structures

(3) Agricultural ponds or recreational ponds, other than those created as compensatory mitigation

(4) Retention/detention ponds

(5) Created stormwater treatment wetlands

(6) Created stormwater treatment swales

(7) Man-made wash ponds in aggregate industries

(8) Low impact development measures that are not created for wildlife habitat

V The commissioner shall have the authority to grant variances from the minimum standards of this section. Such authority shall be exercised subject to the criteria which govern the grant of a variance by a zoning board of adjustment under RSA 674:33, I(b).

Amend RSA 4895-A:17, I, Terrain Alteration

Amend RSA 485-A:29, I, Sewage Disposal Systems

Amend RSA 483-B, Comprehensive Shoreland Protection Act

With addition of statement “and ensuring compliance with the provisions of RSA 482-A:4-a, regarding wetland buffers”

(Revision Date 10-7-10)
RSA 482

Amend 482-A:2 Definitions by inserting the following definitions:

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Amend 482-A:3 by adding the new section:

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(a) Agriculture meeting Best Management Practices

(b) Forestry activities meeting Best Management Practices;

(c) Activities for the management of areas to deter wildlife for public safety purposes, such as areas around airports;

(d) Public utility maintenance activities conducted in accordance with *Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire published by DRED (see RSA 482-A: 3, XV}*

(e) Activities subject to permit-by-notification

Amend RSA 482-A by inserting after section 4 the following new section:

482-A:4-a Regarding Wetland Buffers.

I. When applicable, any wetland within 100 feet of any clearing, disturbance or structure shall be evaluated and scored using the Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire as published by the University of New Hampshire Cooperative Extension in 2010. A NH Certified Wetland Scientist or other qualified professional as determined by the Department shall prepare the evaluation. Wetlands on site shall be evaluated in the field. Wetlands on abutting properties may be evaluated by remote sensing. Numeric scores shall be determined for the following wetland functions as identified in the document, which shall be grouped as indicated:

(a) Category 1 – ecological integrity, wetland-dependant wildlife habitat;

(b)Category 2 –sediment trapping, and nutrient trapping/retention/transformation.

The function of ecological integrity shall be evaluated to determine if the score is equal to or exceeds 8.5.
The function of wetland-dependant wildlife habitat shall be evaluated to determine if the score is equal to or exceeds 8.0.
The function of sediment trapping shall be evaluated to determine if the score is equal to or exceeds 8.0.
The function of nutrient trapping/retention/transformation shall be evaluated to determine if the score is equal to or exceeds 8.5.

II. If any of the functions in category 1 are equal to or have exceeded the numeric score, the associated wetland shall have a wetland buffer of 100 feet in width. If that is not the case, then if any of the functions in category 2 are equal to or have exceeded the numeric score, the associated wetland shall have a wetland buffer of 50 feet in width. If that is not the case, then there shall be no wetland buffer under this section unless otherwise provided by other local, state or federal law. No activities shall take place in the wetland buffer that will degrade the identified function of the wetland, unless so allowed by the Department as provided in paragraph III.

III. The Department may provide relief to the requirements of this section if it can be shown that a proposed action will result in an equivalent or increased level of ecological benefit to the wetland. This may include narrowing one or more areas of wetland buffer, provided others are widened, or accepting other mitigating measures.

!V Wetland types exempt from this section:

(1) Man-made ditches

(2) Man-made water conveyance structures

(3) Agricultural ponds or recreational ponds, other than those created as compensatory mitigation

(4) Retention/detention ponds

(5) Created stormwater treatment wetlands

(6) Created stormwater treatment swales

(7) Man-made wash ponds in aggregate industries

(8) Low impact development measures that are not created for wildlife habitat

V The commissioner shall have the authority to grant variances from the minimum standards of this section. Such authority shall be exercised subject to the criteria which govern the grant of a variance by a zoning board of adjustment under RSA 674:33, I(b).

Amend RSA 485-A:17, I, Terrain Alteration

Amend RSA 485-A:29, I, Sewage Disposal Systems

Amend RSA 483-B, Comprehensive Shoreland Protection Act

With addition of statement “and ensuring compliance with the provisions of RSA 482-A:4-a, regarding wetland buffers”

Report of the Definitions Subcommittee ----Draft 10-7-10

The definitions subcommittee was formed at the February 23rd, 2009 meeting of the HB 1579 Land Use Commission. James Gove was appointed as chair of the subcommittee.

The subcommittee decided Indirect Impacts would be defined, but Cumulative Impacts would be left for another time. For defining the impacts, the primary functions of Water Quality, Water Quantity, and Wildlife would be considered. To define what constitutes Indirect Impacts, it was determined we needed to use set parameters to determine when such impacts are present from a proposed project.

Indirect impacts defined: "It is very likely that negative impacts due to indirect activities will occur to some wetlands and not to others. Not all indirect impacts will have a detrimental effect on all wetlands. Not all wetlands need to be protected from indirect impacts." This concept was voted on unanimously.

To identify those wetlands that might need protection from indirect impacts, it was agreed that a numeric evaluation method should be used. Given the various evaluation methods currently in existence, the NH Method (revised) would be the only one to give a numeric evaluation.

The subcommittee agreed that it was the functions of a wetland that was important for a numeric evaluation. It was agreed unanimously that sound science basis via the NH Method (revised) was to be used to evaluate the certain functions of a wetland to determine its priority for protection.

As there are no other methods that provide a numeric ranking for certain wetland functions, that the subcommittee was aware of, it was agreed that the NH Method (revised) would be used.

It was agreed that "best professional judgment" was not a sound scientific method of evaluating wetlands.

The functions of water quality, water quantity and wildlife habitat were agreed to be the most important functions for determination of indirect impacts. In the NH Method (revised), wildlife habitat function would be evaluated by the functions of Ecological Integrity and Wetland Dependant Wildlife Habitat. Sediment Trapping and Nutrient Removal/Retention/Transformation would evaluate the water quality/quantity functions. The other functions evaluated by the NH Method (revised) would not be used in the scoring.

The subcommittee felt that only the most valuable wetlands, based upon the functions of water quality/quantity and wildlife habitat, should be protected from indirect impacts. Not all wetlands need to be protected from indirect impacts.

It was determined that the most effective and equitable way to protect the valuable wetlands from indirect impacts would be with an upland buffer. An upland buffer of 100 feet horizontal distance from the wetland edge would be used for those wetlands that score for the wildlife habitat functions. While buffer widths for the protection of wildlife habitat can be debated, the research of the subcommittee determined that a 100-foot wide buffer provides substantial protection to wetland dependant species. Further, there is precedence in the State for 100-foot buffers for valuable wetlands including the 100-foot tidal wetland buffer and the 100-foot Prime Wetland buffer.

An upland buffer of 50 feet horizontal distance from the wetland edge would be used for those wetlands that score for the water quality/quantity functions. As with the wildlife buffer widths, the width of a buffer to protect the wetland water quality can be debated. However, the research of the subcommittee determined that a 50-foot buffer of native vegetation provided protection from phosphorous and sediment runoff, which are the primary pollutants from disturbed/developed areas.

The functional scores that were used in the work product of the subcommittee reflect the intent to protect the most valuable wetland resources of the state. While the NH Method has been used in the state for over 20 years, the revised NH Method has just been published was available for testing this summer. Therefore, the scores used by the subcommittee in the work product may need to be revised in the future. The estimation by the subcommittee is that between 10% and 25% of the wetlands in the state will have the scores to qualify as requiring a wetland buffer.

It is the conclusion of the subcommittee that the approach taken by the work product (revisions to RSA 482-A), would be the preferred method of addressing indirect impacts to the valuable wetlands of the state.

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These buffers and use of the NH Method (revised) to score the functions of wetlands as described in the subcommittee work product would be added to the Excavation and Fill and Alteration of Terrain permit review processes.

The functional scores that were used in the work product of the subcommittee reflect the intent to protect the most valuable wetland resources of the state. While the NH Method has been used in the state for over 20 years, the revised NH Method has just been published was available for testing this summer. Therefore, the scores used by the subcommittee in the work product may need to be revised in the future. ~~The estimation by the subcommittee is that between 10% and 25% of the wetlands in the state will have the scores to qualify as requiring a wetland buffer.~~

It is the conclusion of the subcommittee that the approach taken by the work product (revisions to RSA 482-A and 485-A:17), would be the preferred method of addressing indirect impacts to the valuable wetlands of the state.

TITLE L
WATER MANAGEMENT AND PROTECTION

CHAPTER 482-A
FILL AND DREDGE IN WETLANDS

Section 482-A:1

482-A:1 Finding of Public Purpose. – It is found to be for the public good and welfare of this state to protect and preserve its submerged lands under tidal and fresh waters and its wetlands, (both salt water and fresh-water), as herein defined, from despoliation and unregulated alteration, because such despoliation or unregulated alteration will adversely affect the value of such areas as sources of nutrients for finfish, crustacea, shellfish and wildlife of significant value, will damage or destroy habitats and reproduction areas for plants, fish and wildlife of importance, will eliminate, depreciate or obstruct the commerce, recreation and aesthetic enjoyment of the public, will be detrimental to adequate groundwater levels, will adversely affect stream channels and their ability to handle the runoff of waters, will disturb and reduce the natural ability of wetlands to absorb flood waters and silt, thus increasing general flood damage and the silting of open water channels, and will otherwise adversely affect the interests of the general public.

Source. 1989, 339:1, eff. Jan. 1, 1990.

Secondary (Indirect) Adverse Impacts

§ 230.11 (h): Secondary Effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material . . .

Secondary (Indirect) Adverse Impacts

Secondary impacts are those impacts outside the footprint of the fill that arise from and are associated with the direct discharge of dredged or fill material. Some examples:

- Fragmentation of wildlife habitat
- Interruption of travel corridors for wildlife (especially for seasonal pools)
- Altered hydrologic regime
- Effects of operation and maintenance activities (e.g., water quality impacts from road salt; invasive species)

Secondary (Indirect) Adverse Impacts

§230.10 (c): No discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the Waters of the U.S. . . .

Under these Guidelines, effects contributing to significant degradation, considered individually or collectively, include significant adverse effects of the discharge of pollutants on:

(1) human health or welfare . . .;

(2) life stages of aquatic life and other wildlife dependent on aquatic ecosystems, including the transfer, concentration, and spread of pollutants or their byproducts outside of the disposal site through biological, physical and chemical processes;

(3) aquatic ecosystem diversity, productivity and stability;

(4) recreational, aesthetic, and economic values.

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

WETLAND WILDLIFE HABITAT MANAGEMENT

(acre)

CODE 644

DEFINITION

Retaining, developing, or managing habitat for wetland wildlife.

PURPOSE

To maintain, develop, or improve habitat for waterfowl, fur-bearers, or other wetland associated flora and fauna.

CONDITIONS WHERE PRACTICE APPLIES

On or adjacent to wetlands, rivers, lakes and other water bodies where wetland associated wildlife habitat can be managed. This practice applies to natural wetlands and water bodies as well as wetlands that may have been previously restored, enhanced, created.

CRITERIA

General Criteria Applicable to All Purposes

Identify species management goals and objectives.

Habitat development and management necessary to achieve the purpose(s), shall be based on a wildlife habitat appraisal or suitable habitat evaluation. The appraisal or evaluation procedure shall be used to determine a habitat suitability for either individual fields, home range areas, habitat type, or natural community; as well as to provide an overall evaluation for the entire property or operating unit.

Habitat Appraisal or Habitat Evaluation:

Wildlife habitat evaluations may be done using any of the following:

NRCS or other formally developed species specific models;

NRCS state developed wildlife habitat evaluation worksheets:

Minimum habitat requirements by species or species groups outlined below under “Criteria Applicable to Specific Species or Groups”;

Wildlife habitat Quality Criteria contained in FOTG Section III

USFWS Habitat Evaluation Procedure Models (HEP);

The evaluation will result in a quality rating or habitat suitability index (hsi) that will consider the type, amount, and distribution of habitat elements required. The quality rating or hsi will be compared to the quality criteria in Section III of the FOTG

If the evaluation indicates a level below the acceptable quality, alternatives will be recommended that will result in the necessary changes in habitat elements or their management to improve the rating to the minimal acceptable level or above.

If the evaluation is at the minimum or above, alternatives will be recommended that will result in the necessary management to maintain or improve the existing habitat in its present state or toward optimum conditions.

HABITAT ELEMENTS:

The following habitat elements will be evaluated when assessing wildlife habitat. Not all may apply to every habitat type or species.

1. Food
   a. Type
   b. Amount
2. Cover
   a. Type
   b. Amount
3. Water
   a. Quality
   b. Quantity
   c. Accessibility
   d. Seasonal availability
4. Interspersion and Distance to:
   a. Crops
   b. Grasses and or legumes
   c. Shrubs
   d. Trees
   e. Water
   f. Openings
5. Migration
   a. Routes
   b. Season of use
   c. Corridors

As indicated by the wildlife habitat evaluation, certain habitat elements may be weak or missing. For the desired species, identify the types, amount, and distribution of habitat elements and management actions necessary to achieve the management objectives.

The amount and kinds of habitat elements planned, their location and management shall be identified in a management plan.

Vegetative manipulations to restore plant and/or animal diversity shall be accomplished by prescribed burning, or mechanical, biological (including prescribed grazing), or chemical methods, or a combination of the four.

Livestock grazing or haying, when used, shall be managed to maintain or improve vegetation structure and composition for the intended purpose.

Vegetation used will be adapted to the local soil/site conditions. Native plant will be used whenever possible.

Management measures shall be provided to control invasive species and noxious weeds. Spraying or other control of noxious weeds or shall be done on a “spot” basis to protect forbs and legumes that benefit native pollinators and other wildlife.

The landowner shall obtain all necessary local, state and federal permits that apply.

Criteria Applicable to Specific Species or Groups

Provide minimum habitat requirements as follows for one or more of the species or groups of species, or in accordance with a species habitat model.

Criteria for Breeding Dabbling Ducks (Teal, Mallard, Pintail, Gadwall, Shoveler, etc.)

Pair Cover. Shallow water areas provided by temporary and seasonal wetlands are need to attract dabbling ducks to an area in the spring and to provide an early food source. Provide at least one acre of shallow water within .5 miles of nesting cover. These areas may occur as separate basins or as the shallow zone of a deeper wetland.

Brood Cover. Semi-permanent and permanent wetland or ponds provide deeper water areas that will generally retain water throughout the summer with emergent vegetation. These wetlands provide a summer food source as well as escape cover. Provide at least one acre within .5 mile of nesting cover.

Nesting Cover. Provide at least one acre of herbaceous cover that is 10 inches or taller from early April through July 15. Scattered clumps or patches of taller grass, forbs or low growing shrubs within such cover areas are frequently preferred nest sites.

Avoid the use of chemicals that could eliminate wetland plants or aquatic organisms important in waterfowl diets.

Criteria for Migratory Dabbling Ducks and Geese

Loafing areas. Provide at least .5 acre of shallow water area per quarter section in most years from February through April 15. Shallow water (1 to 10 inches deep) is provided by temporary and seasonal wetlands, ponded fields and pastures. Ponded cropland fields

that have been spring or fall tilled are of less benefit than no-till fields.

Feeding Areas. Provide at least 40 acres of growing winter wheat or rye or multch till (30% or more ground cover) or no till corn, oats, or millet within 1 mile of loafing areas. Or provide at least 3 acres of seasonal or semi-permanent wetlands with at least 25% of the wetlands water surface unobscured by emergent vegetation.

Avoid the use of chemicals that could eliminate wetland plants or aquatic organisms important in waterfowl diets.

Criteria for Wood Ducks

Brood Cover. Provide a minimum of 10 acres of semi-permanent or permanent wetlands, perennial streams, ponds or lakes. Dense emergent vegetation or overhanging shrubs, or trees must cover a minimum of 25% of the water surface. Ideal overhead cover provides a dense canopy cover of 50-75% of the water surface with crowns 2-4 feet above the water surface.

Nesting Cover. Provide tall trees capable of providing suitable cavities or constructed nest boxes no further than 150 feet from Brood cover. Because natural cavities must have an entrance of at least 4 inches, an inside diameter of approximately 8 inches and cavity depth must be at least 24 inches; trees will be a minimum of 12 inches in diameter at a height of approximately 20 feet. Cavities located 30 feet or more above the ground are preferred.

Avoid the use of chemicals that could eliminate wetland plants or aquatic organisms important in waterfowl diets.

Criteria for Amphibians and Reptiles

Wetland. Establish and maintain a buffer zone of native wetland plants around the wetland edge. This buffer should be a minimum of 50 feet wide. Maintain natural water level fluctuations. Do not introduce non-native plants or animals including fish. If the site supported some trees in its native plant community, it is beneficial to place logs and other woody debris in the wetland.

Upland. Establish and maintain a native upland plant community a minimum of 500 feet wide around the wetland.

Avoid the use of chemicals that could eliminate wetland plants or aquatic organisms important in waterfowl diets.

CONSIDERATIONS

Consider that manipulations of habitat may impact more than the desired kinds of wildlife. These possible affects shall be evaluated and taken into consideration during the planning process.

This practice may be used to promote the conservation of declining species, including threatened and endangered species.

For species requiring large blocks of habitat, consider addressing habitat fragmentation.

Consider habitat linkages and habitat corridors when developing wildlife habitat. Vegetative buffers should be included as needed to benefit the wetland and the wildlife using it.

Consider effects of movement of dissolved substances on groundwater and on downstream surface waters.

Consider effects that hazardous materials, expected or known to occur on the site, may have on wildlife or human use.

Where feasible, consider utilizing prescribed burning instead of mowing.

Biological control of undesirable plant species and pests (e.g., using predator or parasitic species) should be implemented where available and feasible.

Consider effects of management actions on compliance with state and federal hunting regulation (e.g., baiting).

Consider effects of management on non-target fish and wildlife species and threatened and endangered species.

Consider effects of livestock grazing on runoff, infiltration, and wetland vegetation.

Consider using artificial nesting structures that are designed for the region.

Consider the impact of increased wildlife use on adjacent lands (e.g., crop depredation).

Consider effect of volumes and rates of runoff, infiltration, evaporation, and transpiration on the water budget.

Consider effects on downstream flows or aquifers that would impact other water uses or users.

Consider adjacent wetlands or water bodies that contribute to wetland system complexity and diversity, decrease habitat fragmentation, and maximize use of the site by wetland-associated wildlife.

Consider effects on movement of sediment and soluble and sediment-attached substances carried by runoff and/or wind.

Consider manipulation of water levels through draw downs and flooding to manage vegetation and create favorable conditions for shorebirds and other wetland species.

Consider using an appropriate Hydrogeomorphic model (HGM) or functional assessment procedure to identify missing components needed to improve wetland functioning.

PLANS AND SPECIFICATIONS

Plans and specifications for this practice shall be prepared for each site. Plans and specifications shall be recorded using approved specification sheets, job sheets, or narrative documentatin in the conservation plan to describe the requirements for applying the practice to achieve its intended use.

Document how habitat needs will be met for the desired species of wildlife such as: required seasonal depth of water types and sizes of structures required; desired plant species and the means of establishing and maintaining them.

OPERATION AND MAINTENANCE

The purpose of operation, maintenance and management is to insure that the practice functions as intended over time.

A plan for operation and maintenance of wildlife habitat at a minimum should include monitoring and management of structural and vegetative measures. Haying and livestock grazing plans will be developed to allow the establishment, development, and management of wetland and associated upland vegetation for the intended purpose and to minimize wildlife disturbance.

REFERENCES

Payne, Neil F. 1992. Techniques for Wildlife Habitat Management of Wetlands. McGraw-Hill, Inc. 549pp.

Midwestern Wetland Flora: Field Office Guide to Plant Species. U.S.D.A. Soil Conservation Service, Midwest National Technical Center, Lincoln, Nebraska. No date.

U.S. Department of Agriculture Natural Resources Conservation Service, Nebraska Biology Technical Note No. 33 – Land Management Guides for Select Wildlife Species, 1980.

U.S. Department of Agriculture Natural Resources Conservation Service, Nebraska Biology Technical Note No. 47 – Best Management Practices for Rainwater Basin Wetlands, 1994.

U.S. Department of Agriculture Natural Resources Conservation Service, Nebraska Biology Technical Note No. 66 – Wetland Water Depths Used by Selected Wildlife Species and Groups, 2000.

U.S. Department of Agriculture Natural Resources Conservation Service, Wildlife Habitat Management Institute – Fish & Wildlife Habitat Management Leaflets . http://www.ms.nrcs.usda.gov/whmi/technotes.htm

U.S. Department of the Interior Fish and Wildlife Service, Waterfowl Management Handbook, 1988.

basis of hydrophytic vegetation, hydric soils, and wetlands hydrology in accordance with the techniques outlined in the *U.S. Army Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1*. (January, 1987) or as subsequently adopted by the State of N.H.

B. An area shall be considered a wetland buffer if it is an upland area immediately adjacent to wetlands as defined in this ordinance. The linear extent of the wetland buffer shall be determined by Table A on the basis of the functional values for the subject wetlands as determined by a certified wetlands scientist.

Wetland Buffer Width Determination Table (Article 202, Table A)

Points	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Buffer Width (ft)	25	35	40	45	50	55	60	65	70	75	80	85	90	95	100

Function/Value	**Points**
FA	1
GW, NR, PE, SR	2
SS, WH, FH	3
ESH, VP	Maximum Buffer

KEY

FA =	Floodflow Alteration
GW =	Groundwater Recharge/Discharge
NR =	Nutrient Removal
PE =	Product Export
SR =	Sediment/Toxicant Retention
SS =	Shoreline/Sediment Stabilization
WH =	Wildlife Habitat
FH =	Fish/Shellfish Habitat
ESH =	Endangered Species Habitat
VP =	Vernal Pool

C. Where the Wetlands Conservation District is superimposed over another zoning district in the Town of Kingston, that district which is more restrictive shall govern.

202.3 WETLANDS CONSERVATION DISTRICT MAP: The Wetlands Conservation District as herein defined is shown on a map designated as "Town of Kingston Wetlands Conservation District" and is a

Guidance on Preparing Cumulative Impact Analyses
Washington State Department of Transportation
February 2008

What is the Purpose of this Document?

This guidance was developed jointly by Washington State Department of Transportation (WSDOT), the Federal Highway Administration (FHWA), and the Environmental Protection Agency Region X (EPA).

Our document is based on recent cumulative effects[1] guidance issued by Texas DOT (2006) and California DOT (2005). We want to thank Texas and California DOTs for sharing their guidance documents and related materials with us. We also carefully examined the national guidance from the Council on Environmental Quality (CEQ) (1997 and 2005).[2]

The focus of this guidance is project level work when FHWA is the lead agency. It was created for our process as it currently exists. However, the intent of FHWA and WSDOT is to improve our identification of cumulative effects prior to the start of NEPA. SAFETEA-LU has set out expectations in Section 6001 to better link planning and NEPA processes. It is our hope that we will continue to improve our early environmental identification including cumulative effects.

This joint guidance addresses cumulative impact analyses for WSDOT projects that are subject to the National Environmental Policy Act (NEPA). For SEPA, a similar process would be followed. Refer to WAC 197-11-330(3)(c) for SEPA only projects.

Our goal for this document is to provide preparers and reviewers with guidance that is both practical and flexible. Cumulative impact analyses will vary according to the type and scale of the proposed project and the resources affected. Therefore, this guidance is intended to be scalable to an individual project depending on the potential effects of the proposed project, the type and condition of resources under consideration, and the professional judgment of the practitioner performing the analysis.

NEPA requires that any agency proposing a major federal action, which may significantly affect the environment, consider the environmental impacts of the proposed action, any unavoidable adverse environmental impacts, and the relationship between local short term uses and long term productivity of the environment (42 U.S.C. § 4332(c)). Some WSDOT highway construction projects that are federally funded or require federal approvals fall under this requirement. The level of analysis for transportation projects range from:

- Categorical Exclusions (CE)- projects in which there are clearly no significant impacts;[3]
- Environmental Assessments (EA)- projects in which the significance of impacts is not clearly known, to;

[1] The terms "effect" and "impact" are used synonymously in the CEQ regulations and in this guidance paper.
[2] See "What references did we use?" at the back of this document.
[3] See "When is a Cumulative Impact Analysis Required?" section in this document for guidance on categorical exclusions. Cumulative effects analysis is generally not required for these documents.

- Environmental Impact Statements (EIS)- projects in which significant impacts are anticipated.

There are three types or categories of effect (or impact) that must be considered during the NEPA process: direct, indirect, and cumulative[4] (40 C.F.R. §1508.25). Identifying direct effects, which are those effects caused directly by our activities, at the same time, and in the same place, is relatively simple and straightforward. Identifying and analyzing indirect effects, which are effects caused by transportation project activities, that occur later in time, at some distance from the project, and are in the chain of cause-and-effect relationships, can be more complex and generate more disagreement. But as complex as indirect effects may be, the cumulative effects analysis generates the most complex and contested issues and is easily the most misunderstood.

This guidance attempts to clarify the requirements for cumulative impact analysis.

> Cumulative impacts are the summation of impacts on a resource resulting from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes those actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

This category of effects has generated numerous national legal challenges to transportation projects during the past few years. Therefore, it is important that we conduct both indirect and cumulative effect analyses in an efficient, consistent, legally defensible, and logical manner. The process recommended here should help us meet that goal for cumulative effects analyses.

Overall, the goal of our analyses and documentation is to foster good decisions and enable effective public participation. WSDOT's written documents should be readable and readily understood by our audience. This guidance attempts to clarify the requirements of cumulative impact analyses and provide a consistent framework for the analyses.

What Approach are We Recommending?

WSDOT, EPA – Region 10, and FHWA – Washington Division have agreed upon the following approach for cumulative effects analyses.

We feel that there is no single formula available for determining the appropriate scope and extent of a cumulative impact analysis based on input received during scoping. Ultimately, the practitioner must determine the methods and extent of the analysis based on the size and type of the project proposed, its location, potential to affect environmental resources, and the health of any potentially affected resource. However, we have agreed upon the following approach for cumulative effect analyses.

Potential cumulative impacts should be considered as early as possible, as you are identifying direct and indirect effects. A cumulative impact analysis builds upon information derived from direct and indirect impacts. This makes it tempting to postpone the identification of cumulative impacts until the direct and indirect impact analyses are well under way. However, such early

[4] See "Definitions" under "Background: Resources and More" starting on p. 18 of this document.

consideration of cumulative impacts may facilitate the design of alternatives to avoid or minimize impacts. Therefore, do not defer the consideration of cumulative impacts. Instead, as you begin to consider a project's potential direct and indirect impacts, start outlining the potential cumulative impacts as well. Once more information about direct and indirect impacts becomes available, use it to further refine the cumulative impact analysis. If you determine that cumulative effects are not an issue, document that decision along with the reasons for the decision.

Unlike direct impacts, quantifying cumulative impacts may be difficult, since a large part of the analysis requires projections about what may happen in a project area. Actions taken by governmental and private entities other than WSDOT need to be considered for a cumulative impact analysis. Partnering with other agencies will make it easier to identify additional information that might be needed.

For the analysis use information from any environmental documents such as discipline reports, as well as other relevant information, such as local comprehensive plans, existing zoning, recent building permits and interviews with local government. These may also be good sources for information on past actions.

A partnership approach for transportation projects can be of great benefit throughout the life of the project, presenting opportunities for gathering valuable information and for partnering on mutually beneficial mitigation. These will benefit your cumulative effect analysis as well. Forging early, cooperative working relationships can result in:

- Collaborative planning between federal, state, and local agencies (see FHWA's web site[5] on scenario planning, an approach that integrates land use and transportation).
- Incorporating reasonable avoidance and minimization opportunities for identified resource impacts.
- Thoroughly documenting your analysis (including assumptions and sources of information), conclusions, and rationale.
- Assuring consistency with regional habitat/restoration planning efforts.
- Identifying opportunities for project stakeholders to become involved in regional planning efforts.

Early collaboration and integrated planning is supported in Section 6001 of SAFETEA-LU[6] It requires Metropolitan Planning Organizations to discuss potential mitigation activities and locations in the Regional Transportation Plan. Also, FHWA's linking of planning and NEPA[7] provides tools for interagency collaborative transportation, land use, and environmental planning.

Washington State's growth management law (GMA) gives an opportunity for efficient multimodal and intermodal transportation systems based on regional and local priorities. GMA requires local comprehensive plans to include identified needs on state-owned transportation facilities from the statewide multimodal transportation plan. This requirement should help keep in check the potential for transportation to affect the rate of growth.

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[5] FHWA Scenario Planning http://www.fhwa.dot.gov/planning/scenplan/

[6] SAFETEA-LU FAQs: http://www.fhwa.dot.gov/hep/section6002/index.htm

[7] Linking Planning and NEPA: http://environment.fhwa.dot.gov/strmlng/linkingtrans.asp

What impacts are included?

Direct impacts are included in a cumulative impact analysis. This information should be gathered from the sections of the environmental document where the direct impacts of the project are discussed. Impacts may include impacts to wetlands, changes in land use (conversion to transportation use), effects on endangered species, as well as other relevant impacts.

Indirect impacts are included in a cumulative impact analysis. Indirect impacts may include land development occurring after a project is constructed. This could be as a result of access to a previously undeveloped property or as a result of changes in traffic patterns that may change the pattern or rate of planned growth. Other examples of indirect impacts could include changes in wildlife populations due to direct effects on habitat, changes in use of a recreation area or park due to improved access or visibility, or reduced flooding severity downstream due to improved highway runoff flow control.

Cumulative impacts include direct and indirect impacts resulting from governmental and private actions. For instance, a "big box" store may be planned near a project area along with a new subdivision. The effects of these actions should be considered along with the direct and indirect effects of our action for a cumulative impact analysis.

When is a cumulative impact analysis required?

The CEQ regulations require that all federal agencies consider the cumulative effects of any proposed action. The level of the environmental study document being prepared will give you some idea about when and if the analysis should be prepared. **If a project will not cause direct or indirect impacts on a resource, it will not contribute to a cumulative impact on the resource.**

Categorical Exclusion (CE): Generally Not Required. These projects are by definition minor projects without significant individual or cumulative environmental impacts, and as such should not require a cumulative impact analysis. There may be unusual circumstances requiring such an analysis, but this should be very rare. If additional capacity is added, you should investigate whether there are any cumulative impact issues.

Environmental Assessment (EA): Generally required. These are projects in which the significance of environmental impacts is unknown. As one of the primary purposes of the EA is to help decision makers decide whether or not an EIS is needed, you will need to conduct an initial environmental assessment. The degree to which resources may be impacted will determine the extent of the cumulative impact analysis needed. Where direct and indirect effects are found to be present, you will need to complete a cumulative impact analysis. When your project is large, complex, and in an environmentally sensitive area, the cumulative impact analysis should mirror what is done for an EIS.

Environmental Impact Statement (EIS): Absolutely required. These are projects in which there are anticipated significant environmental impacts, and a cumulative impact analysis may assist decision makers in making decisions of project scope, design and location. In general, the cumulative impact analysis should include substantial information about resources, past actions that have contributed to trends and reasonably foreseeable effects.

See page 45 in CEQ guidance, *Considering Cumulative Effects Under NEPA.*

How do I Prepare a Cumulative Impact Analysis?

The cumulative impact analysis should begin early in project development, usually during the NEPA scoping process. As the process continues, use the gathered data to further refine the cumulative impact analysis. The following eight steps serve as guidelines for identifying and assessing cumulative impacts:

1. Identify the resources that may have cumulative impacts to consider in the analysis;
2. Define the study area and timeframe for each affected resource;
3. Describe the current health and historical context for each;
4. Identify direct and the indirect impacts that may contribute to a cumulative impact;
5. Identify other historic, current and reasonably foreseeable actions that may affect resources;
6. Assess potential cumulative impacts to each resource; determine magnitude and significance;
7. Report the results; and
8. Assess and discuss potential mitigation issues for all adverse impacts.

Note that these steps are iterative and may not necessarily be sequential. It may be appropriate to identify the resources included in the analysis (Step 1), then apply Steps 2 -6 to each resource, rather than doing each step and re-listing each resource under every step. Steps 7 and 8 can be done at the end. As new information becomes available, it could alter decision making possibly resulting in changes in methods to avoid and/or minimize impacts.

If you are looking for background on related case law, the meaning of relevant terms, a comparison of our eight steps with the CEQ guidance or additional references refer to the last pages of this document starting on page 18.

Step 1: Identify the resources to consider in the analysis

The first step in performing the cumulative impact analysis is to identify which resources to consider in the analysis. **If a project will not cause direct or indirect impacts on a resource, it will not contribute to a cumulative impact on the resource.**

List each resource area for which the project could cause direct or indirect impacts. The cumulative impact analysis should focus on: 1) those resources that could be substantially affected by the project in combination with other past, present, and reasonably foreseeable future actions: and 2) resources currently *in poor or declining health* or at risk even if project effects are relatively small.

There is a caveat -if the effects caused by the WSDOT project are minor, but actions by other agencies/developers cause substantial effects, this should be included. The key factor is whether there are substantial effects on the resource under consideration, not whose actions are causing the effects. In other words, the effects can be substantial even if the effect of WSDOT's proposed action is minimal. Regardless of the cause, the health of the resource should be discussed. Because the focus is resource by resource, it may be necessary to conduct separate cumulative effects analyses.

Step 2: Define the study area for each resource

Cumulative effects are considered within spatial (geographic) and temporal boundaries. By defining a Geographic Resource Study Area for each resource, you will identify the geographic boundaries for each resource to be included in the cumulative impact analysis. You will also identify a temporal boundary (past and future).

Environmental specialists (biologists, archaeologists, historians, land use planners, water quality specialists and others) can help to identify appropriate Resource Study Area boundaries for each resource in the cumulative impact analysis based on their knowledge of the resources and regulatory mandates. Public agency representatives, tribes and interested citizens may also offer input during the scoping process.

Geographic Resource Study Area

Many approaches are available to define a geographic resource study area for a cumulative impact analysis. Start with the direct and indirect effects study area already defined for each resource. The following examples describe ways to identify the Geographic Resource Study Area for a few specific resources:

- **Wetlands and water quality.** Identify the drainage basin (watershed) or sub-basins in which the project would be located. If necessary, consult with environmental specialists to discuss potential Resource Study Areas.

- **Archaeological resources.** Identify prehistoric and/or historic archaeological sites in the project vicinity. Determine the geographic context for the type of archaeological resources being affected. Examine the project's historic property survey report. A context will be described in this document, typically including a discussion of geographic range or distribution of sites. Refer to the Area of Potential Effects (APE) if already set.

- **Historic architectural resources.** Identify historic districts and neighborhoods containing affected buildings or structures. Project-specific historical resource analyses typically define the geographic context needed to understand the historic significance of a structure (e.g., period of significance and neighborhood, community, or resource type).

- **Threatened and endangered species.** Determine the local population of individual species and a general study area by considering the range, sub-range, or population distribution for the species. Consult biologists specializing in particular species for assistance in defining reasonable Resource Study Areas. Remember that this guidance is for NEPA compliance only. ESA has different requirements for cumulative effects analyses. This guidance is not intended for cumulative impact analyses for biological assessments prepared to comply with Section 7 of the federal Endangered Species Act (ESA). For ESA cumulative effects, only non-federal actions are included in the specific consultation analysis. Effects of these actions on species are analyzed within the action area; the area subject to consultation.

- **Community disruption/division/displacement.** Identify neighborhood or community boundaries using census and other data such as public school data. Local comprehensive plans can be a data source as well as public involvement and interviews with local service agencies.

Temporal Resource Study Area

Cumulative impact analyses should include a time frame as well as a geographic study area. There is no predetermined time frame. The time frames chosen should reflect the resource concerns, geographic resource study areas, the project, and how other important resources fit in. Choose past and future time frames based on what has happened and is proposed to happen in the area. For instance, when did past actions decrease the quality and health of a particular resource? The idea is to use a timeframe that goes back far enough to provide a reasonable historical context to tell the story about important trends and the current state of the resource.

A "future" year should also be selected. As with historical timeframe, the projected year should be based on providing a reasonable context to estimate the future state of the resource. This may be when a proposed development (subdivision or regional shopping mall as examples) is complete. Another example is using the long range transportation plan horizon year or project design year. Some effects or trends may require an even longer future horizon to be meaningfully examined.

After describing why the temporal study years were selected, you should also describe the characteristics of the study years. Describing the rationale for why the temporal study years were selected allows decision makers and interested readers to know the reasons behind your decision.

Step 3: Describe the current status/viability and historical context for each resource

The purpose of Step 3 is to begin to "tell the story of the resource" by: A) describing the current health, condition, or status of the resource within the Resource Study Area and B) providing historical context for understanding how the resource got to its current state. Historical context includes historical uses of a resource or an area or past practices and behaviors. The information in the "Affected Environment" section of the proposed project's draft environmental documents can provide one useful reference keeping in mind it may only give current conditions. Once the health and historical context of these resources is described, the effects of future actions on these resources will be assessed (Steps 4 and 5).

Current Health of the Resource

"Health," as it is used here, refers very broadly to the overall conditions, stability, or vitality of a resource, regardless of whether it is natural (e-g., a wetland) or social (e.g., a community). There are a variety of ways to determine the current health or status of the resource within the Resource Study Area. The practitioner may rely on their own professional expertise; consult other technical specialists on the project team; access resource inventories, assessments, or other data sources; and review environmental documents for other nearby projects. When determining the health of the resource use the Resource Study Area you defined in Step 2.

The health or status of the resource should include a description of trends affecting it. These recent trends are meant to help provide an historic context of the current condition of the resource. (Recent trends are distinct from the more long-range historical context that will be considered below). Many circumstances might indicate a trend that could affect the resource. Examples include: government decisions (e.g., a recent zoning change or preparation of a habitat conservation plan), community preferences (e.g., passage of a measure to protect a historical downtown neighborhood), demographic changes (e.g., a shift in population growth rate), or natural phenomena

(e.g., changes resulting from an earthquake, flood, or fire). Examine the circumstances to determine if there is a pattern indicating a trend or if it is a single event without a discernable pattern.

These trends may indicate whether the health of the resource is improving, stable, or in decline. This is valuable to the analysis in two ways: first, it will help the practitioner to focus the cumulative impact analysis more closely on the resources that are in decline and second, it may help the practitioner to propose more effective mitigation in Step 8 of the analysis.

In some cases it is clear that a resource is in good health. For example, if a historic district consists of multiple buildings that have retained their original character, are occupied and the economic forecast is good, this may indicate that the health of the historic district is good or excellent. In some cases it is also clear the resource is in poor health, such as when a species is listed as Threatened or Endangered, or when major streams within the proposed project's Resource Study Area are listed on the federal Clean Water Act Section 303(d) list of impaired waters.[8]

Similarly, in some cases it will be easy to determine the effect of recent trends on the health of a resource. If a historic district includes many abandoned historic buildings, and the local City Council has recently approved building permits that could demolish some of the historic buildings and construct new high-rise buildings in their place, these trends could indicate that the condition of the historic district is declining. If an organization funded and implemented a plan to clean up a polluted stream, including protecting riparian habitat, providing an appropriate buffer, and committing to long-term monitoring and adaptive management, this might lead to an improvement in the stream's water quality.

Historical Context of the Resource

The goal of identifying the historical context is to give the reader (decision maker) a reasonable explanation of how the resource got to its current state. Providing historical context is not the same as providing a list of every project or action that has affected the resource over time. It is not realistic or necessary to provide an exhaustive "laundry list" of projects throughout the years. Rather, the historical context should identify key historical patterns or activities that have contributed to the current condition of the resource.

To describe the historical context of a resource, begin by identifying key patterns or activities in the past that have influenced it. These may be related to notable changes to the region's land use or demographic patterns. Then characterize the nature of the influence that these patterns or activities have had on the resource, such as destruction or degradation of habitat. To describe the historical context, use historical information. This information may be quantitative, qualitative, or both. Quantitative information is useful for determining trends over time, but it is not always available. A qualitative description can also be useful in providing historical context. The goal is to tell the story about the resource. If there are not enough quantitative data, then use qualitative information. Conversely, even if a lot of quantitative information is available, it may not all be relevant to the analysis. Unless it is useful to the analysis, do not include it.

[8] If fecal coliform is the reason for the 303(d) listing, mention it in the document, but clarify that it is not a transportation product.

These examples show that the historical context, current health and trends of a resource can be described with a few sentences. You only need to use enough data or words to tell the story about each resource.

Four Examples of Historical Context

Example 1: Farmland

The project is located in a rural area that is now transitioning and being rezoned into suburban and industrial land uses. Since approximately 1980, more than 400 acres of land used to produce hops and daffodils have been converted to residential and industrial land uses. The study area encompasses half of that area.

Example 2: Wetlands

The project crosses a stream. While the stream is not navigable, it is subject to the jurisdiction of the U. S. Army Corp of Engineers under Section 404 of the Clean Water Act. Past land development has been minimal, but approximately .25 acres of the stream have been disturbed by another infrastructure project.

Example 3: Community Cohesion

The project is located in an area where there is large Hispanic population. A previous project bisected the community. Development has occurred along the existing roadway. Current development plans within the resource study area indicate the development of a single family subdivision of 127 units, and a commercial strip mall. The total impact of these third party actions is the development of 222 acres. These developments are occurring regardless of the WSDOT project.

Example 4: Peregrine Falcons

Peregrine falcons began to experience a substantial decline in the 1940s as a result of the use of the pesticide DDT. By the 1970s populations in the west were reduced by 80 to 90 percent. In 1970 they were listed as an endangered species by the U.S. Fish and Wildlife Service. A survey in 1980 identified only five nesting pairs in Washington State. They were listed as a state endangered species that year. DDT was banned in 1972. Since then, the peregrine falcons' numbers have increased. In 1999 they were removed from the federal threatened and endangered species list. In 2002 they were down-listed at the state level from endangered to sensitive in Washington State.

Step 4: Identify direct and indirect impacts of the project that might contribute to a cumulative impact

A cumulative impact analysis must look at the impacts of a proposed project in combination with the impacts of other past, present and reasonably foreseeable projects identified within a Resource Study Area.

If your project does not have a direct or an indirect effect on a resource it cannot have a cumulative effect on that resource.

Step 4 helps to identify the direct and indirect impacts for each of the proposed project alternatives on the resources identified in Step 1. It is important to differentiate each alternative's potential to contribute incrementally to cumulative impacts.

Direct Impacts

The cumulative impacts analysis should summarize the direct impacts of the project. The information may be presented in a table, referring back to the text of the environmental document for more information on the direct impacts.

Indirect Impacts

These are impacts that often relate to changes in land use; such as addition of new impervious surface, filling of wetlands, modification of habitat. While land use changes are the direct result of local planning decisions (and FHWA and WSDOT have no control over local land use decisions), there may be indirect impacts associated with transportation projects that affect the rate and pattern of development that should be analyzed. For example, if WSDOT constructs a bypass route around a town, restaurants, gas stations and other forms of development may relocate to the bypass in order to get more business from intercity traffic, while development and economic vitality along the original route may decline.

In general, projects in a new location or projects in which there is a dramatic change in travel lanes (e.g., from two to six lanes with grade separations) are more likely contribute to indirect impacts than projects in areas which are already developed, or involve a smaller increase in capacity.

To evaluate the potential for indirect impacts, you should evaluate the likelihood of development in the project area following project construction. To do this, use the following:

- Look at population and land use trends in the project area and region or subarea. How has the area developed? How fast is it planned to develop? Will the project affect the rate of development? Are people building in the area? Look at the pattern of zoning. Has it recently changed or is it about to change?

- Review the local comprehensive plans. Are there plans/plats in the project area approved or currently under review? Is the area within the urban growth boundary or outside it? Is the city planning on moving the urban growth boundary to allow for growth or are they concentrating on infill? Does the transportation element of the plan include the transportation project? Would the transportation project support the local decisions contained within adopted plans? Do the city planners expect the project to support or encourage development?

Use your professional judgment, as well as discussions with the city or county in the project area, as well as any other experts in the area to determine what development is probable. For instance, if a developer has a good track record in completing platted developments, the proposed development is likely to be developed.

Examples

Example 1: Project Z is proposed to bypass the City of Whoville. According to the city, there are plans for several local businesses to relocate to the western terminus of the proposed bypass, to

maximize intercity travel stops. The developments will not occur in this location if the bypass is not constructed nor will they be constructed if not granted rezoning and building permits by local agencies. The local businesses planning to relocate from the downtown area include a gas station and a restaurant. In addition, the city planners indicate that two fast food restaurants are planning to locate new franchises in Whoville and plan to locate at the western terminus of the proposed bypass. If the bypass is not built, these developments will not be located there.

Given that there are no frontage roads along the bypass and limited access, it is likely that only the termini and interchanges will experience land changes. At this time, only the western terminus has development proposed. Beyond the land use changes discussed, there are no other developments planned with one exception. A "big box" store is going to be built in the area of the bypass. This development will happen regardless of whether the bypass is built or not. These third party actions would total 50 acres.

In addition to the 20 acres of land rezoned and converted from agricultural to retail/commercial as a result of business relocating along the new corridor, another indirect effect of the bypass could be some deterioration of the downtown as a result of the new corridor. The bypass could be particularly difficult for city center businesses that rely on pass through traffic. Some of these impacts could be beneficial. If the project improves access to the city, it could lead to an increase in density which is supportive of improved transit services. Additionally, the concentration of growth within the urban growth boundary can slow down sprawl.

Alternative	Direct + Indirect Acres	Third Party Actions Acres	Cumulative Acreage
Build	100 + 20	50	170
No-Build	0 + 0	50	50

Use the information in Step 4 to combine it with the impacts of other reasonably foreseeable actions (Step 5) to perform the cumulative impact analysis (Step 6).

Step 5: Identify other current and reasonably foreseeable actions

Step 1 and 2 of this guidance identified the resources to consider in the cumulative impact analysis and the geographic area to be considered for each resource (Resource Study Area). The procedures set forth in Step 3 help with describing the health of the resource by discussing the historic context and current trends affecting the sustainability of each resource. Step 4 identifies direct and indirect actions or project impacts that could contribute to a cumulative effect. The purpose of Step 5 is to identify other current and reasonably foreseeable projects to be considered in the cumulative impact analysis. Ask yourself what else might affect these resources.

The following list suggests some examples of current and reasonably foreseeable trends, events, actions or projects that may be included in a cumulative impacts analysis:

- Projected land use and other information in local or regional comprehensive plans
- A development proposal, which has been filed with the local government, county or other plat-approving agency and has SEPA permit applications complete.

- Population/ employment trends which are identified in local or regional comprehensive land use plans
- Planned and funded transportation improvements by city or county governments
- Building permits issued by the local agency with jurisdiction, but that are not built yet.
- Local or regional infrastructure projects that could impact resources (schools, hospitals, manufacturing, shipping etc.)
- Trends related to global climate change, as we currently understand them and related to the project, should be discussed to the extent possible.
- Trends in land development patterns, such as, growth/expansion around interchanges; zoning changes to accommodate development pressures once transportation improvements occur.

Keep in mind that CEQ regulations, as reflected in FHWA's *Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process* (Interim Guidance, January 2003), require cumulative and indirect impact analyses to focus on actions "that are likely or probable, rather than those that are merely possible." It can be challenging to discern "probable" from "possible." There are tools and processes that can be used to help make the distinction. You can begin by asking some basic questions.

The cumulative impact analysis should only include those proposed actions or projects with a reasonable expectation of happening. When identifying reasonably foreseeable actions begin with asking questions like the following:

- Is the proposed project included in a financially constrained plan?
- Is it permitted or in the permit process?
- How reasonable is it to assume that the proposed project will be constructed?
- Is the action identified as high priority?

An affirmative answer to any of these questions may indicate the action is reasonably foreseeable.

Count what counts. According to CEQ, "a cumulative effects analysis should 'count what counts', not produce superficial analyses or a long laundry list of issues that have little relevance to the effect of the proposed action or the eventual decisions."

CEQ advises practitioners to consult with the staff of an appropriate agency to identify reasonably foreseeable future actions based on that agency's planning process. Project scoping can provide an opportunity for these agency discussions. For further information, refer to Chapter 2 of CEQ's guidance document, *Considering Cumulative Effects under the National Environmental Policy Act* (1997).

Both quantitative and qualitative data are appropriate to use in evaluating cumulative impacts. Quantitative data are preferable, and should be used whenever relevant data are available. However, qualitative data are also important, particularly to those analyses more dependent on human perception, such as aesthetics or community disruption.

Use the best data you have available. In cases where data are incomplete or unavailable, communicate with experts, individuals and cooperating agencies as soon as possible, because such communication can lead to additional opportunities for data collection and help all participants reach an understanding concerning the availability and acceptability of relevant information. When

preparing an Environmental Impact Statement or Environmental Assessment where there is incomplete or unavailable information for a reasonable foreseeable significant adverse effect, refer to CEQ's guidance at 40 CFR 1502.22. It lays out principles regarding what to say about the incomplete or unavailable information, and when to obtain additional information. In some cases, it may be helpful to obtain objective professional judgment through a structured and efficient process such as a Delphi Panel.[i] Keep in mind that a cumulative impacts analysis could likely change over a 24-60 month period, so the analysis and data may need to be revisited during the life of an EIS.

It is important when preparing NEPA documents to be clear on what information was available and analyzed. The NEPA document should be viewed as a disclosure document. NEPA is an open process. NEPA does not require an answer that will satisfy everyone; rather, NEPA requires a well-researched and reasoned analysis based on a hard look at the best available information.

Be sure to document the assumptions and methods used to identify actions included in the analysis, the agencies and experts consulted, and any other research. It is important to identify our sources and maintain a record of methods, assumptions, and analyses. This is especially important when data are scarce.

Step 6: Identify and assess cumulative impacts

After the Resource Study Areas have been identified for each affected resource (Step 2), the health of the resources has been assessed and put into historical context (Step 3), the direct and indirect impacts of the proposed project have been identified (Step 4), and the direct and indirect impacts of other reasonably foreseeable actions have been assessed (Step 5), the information is ready for analysis. In Step 6, the information is reviewed and analyzed.

Review the Information Gathered

The information gathered to define the Resource Study Area and to define the context for the resource should provide a sense of the health of the resource. Developing the "reasonably foreseeable" list of actions to include in the cumulative impact analysis will also provide insight into the prospective changes within the Resource Study Area, and how those changes will affect resources. This review will also provide a sense of the amount and quality of data that will be available to conduct the cumulative impact analysis.

Assess the Cumulative Impacts

The proposed project's cumulative impacts can be assessed using a variety of methods and tools that are suited to different levels of analysis. The practitioner, with appropriate input as needed, selects the methods(s) and tool (s) on a case-by-case basis for each resource being analyzed. Chapter 5 of CEQ's *Considering Cumulative Effects* describes a variety of methods or tools - both qualitative and quantitative for evaluating cumulative impacts. These range from simpler methods that may require less time and financial resources, such as matrices or mapping overlays, to data-intensive methods such as modeling or trends analysis. Table 5-3 on pages 56-57 of the CEQ document describes these methods, as well as their strengths and weaknesses.

The method(s) used may vary depending on the resource considered, the type of available information, and the scale of the proposed project. More than one method can be used to assess cumulative impacts on a single resource. For example, the cumulative impact analysis of a species could combine Geographic Information Systems (GIS) mapping and consultation with species

experts. GIS would show historical and anticipated changes in the size and location of species habitat, and the consultation would provide information on the condition of the species and the species' ability to adapt to anticipated biological stressors.

Drawing Conclusions

In previous steps, the practitioner collected data and information and applied a method(s) to analyze this information. Based on that analysis, the practitioner now draws conclusions about the cumulative impacts to resources by applying professional judgment to the results, and by coordinating with technical experts as warranted.

First, the practitioner answers the question, "Is there a cumulative effect?" If the results of the analysis indicate that the proposed project, in combination with other actions, would affect the health of the resource or a trend associated with a resource, the practitioner can conclude that the proposed project will contribute to a cumulative effect (either beneficial or adverse).

Next, the practitioner uses the results of the analysis to characterize the severity or magnitude of the cumulative effect. Consider the following question: "What do decision-makers need to know about the status of this resource within the Resource Study Area?" The practitioner should document the following for each resource:

- The health, status or condition of the resource as a result of past, present and reasonably foreseeable impacts.

- Avoidance and Minimization. Any project design changes that were made or additional opportunities that could be taken, to avoid and minimize potential impacts in light of cumulative impact concerns.

The CEQ guidance discusses using the concepts of context and intensity in making impact conclusions. We recommend considering the context and intensity of the proposed project's cumulative impacts. This will help the practitioner to make conclusions about the severity of these impacts. Chapter 4 of CEQ's *Considering Cumulative Effects* provides additional information on assessing the magnitude and significance of cumulative impacts. For most resources, the NEPA cumulative impact analysis conclusion will not require a description of the severity of impact (e.g., substantial, moderate, minor, significant) unless the method specifically reports results in such terms.

Once the cumulative impact analysis is complete, review the conclusions of the cumulative impact analysis with the conclusions from the direct and indirect impact analyses of the proposed project. This comparison can test the soundness of the conclusions about each resource. For example, if the direct and indirect project impacts would result in a 0.2-acre loss of wetland habitat in a Resource Study Area that contains more than 100 acres of similar habitat, a substantial contribution to cumulative impacts might not be anticipated. However, recognize that if this same 0.2- acre impact affects an extremely rare or threatened resource, the cumulative impact may be considered substantial. You will need to know what is happening and anticipated for the other 99.8 acres to draw your conclusions.

Step 7: Document the results

The purpose of Step 7 is to document the results of the step-wise cumulative impact analysis process. The product of Step 7 will be included in the NEPA document. It is a summary of the analysis approach and conclusions. This summary should include the identification of resources considered in the analysis, the Resource Study Area for each resource, and the conclusions concerning the health and historical context of the resource (Steps 1 through 3). Step 7 also presents project impacts that might contribute to a cumulative impact (Step 4), other reasonably foreseeable actions considered in the cumulative impact analysis (Step *5),* and the conclusion of the analysis as outlined in Step 6.

The information presented in Step 7 is a summary, consistent with NEPA disclosure requirements. The audience for the information presented in this step is decision-makers and interested members of the public, agencies, and affected tribes. Therefore, it is important for the practitioner to clearly state the conclusions of the analysis. Include information about the methods and assumptions underlying the analysis.

Describe the Analyses, Methods or Processes Used

Briefly state how the impact analysis was conducted. For example, you may have plotted GIS overlays of proposed projects (developments) and known locations of an endangered plant species. Briefly explain this approach and include any of the figures or data used to draw conclusions if they provide illustration or clarification. Provide references or footnotes as needed to document sources.

Explain the Assumptions

Explain any limitations that were faced in conducting the analysis. Reviewers will need to know how conclusions were reached in situations for which there were data gaps, scarce information, or limitations or obstacles associated with obtaining the data (e.g., data were cost prohibitive). If models were used, explain the assumptions on which the models are based.

For the purposes of NEPA disclosure, the cumulative effects discussion should compare the cumulative impacts of each alternative (including the "No Action" alternative). A typical statement might say, "Alternative A would adversely affect 0.4 acre of wetlands. Alternative A, in combination with other actions, contributes to an adverse cumulative impact to wetlands, while Alternative B does not."

How to Summarize Cumulative Impact Analyses in the Environmental Document

The document should include a summary of the results of each analysis, all the steps in adequate detail to fully disclose the strengths and/or weaknesses of the analysis as well as the analytical methods and assumptions used. This cannot be overstated - the decision-maker (as well as any other reader) should be able to determine not only what you concluded, but how and why you concluded what you did.

It's the project team's decision on where to best place the Cumulative Impacts Analyses in the environmental documents. In some cases, it should be a separate section to effectively show all the cumulative impacts and how they interrelate. In other cases, it can easily be summarized in each technical report. Which ever approach you use make sure the cumulative impacts analyses compares the reasonable and feasible alternatives fully considered in the environmental document and the No Action Alternative.

Step 8: Assess the need for mitigation

In most cases, a cumulative impact results from the combined actions of numerous agencies and private entities. In Step 3, you looked at trends and disclosed those with adverse or negative effects on a resource if that resource is also affected by your project. Now, in Step 8, you need to discuss potential mitigation. Implementing a potential mitigation measure to address cumulative impacts is often beyond the jurisdiction of FHWA, WSDOT, or other cooperating agencies. By using the steps in this guidance, you would gather information early in the process, become aware of how the effects of the proposed project may combine with other effects, giving you opportunities to use elements of mitigation (avoidance and minimization) throughout the development of the project. If unavoidable, adverse cumulative effects remain, you will need to describe or suggest compensatory mitigation that could be implemented by the appropriate party. Let us explain further.

FHWA's NEPA regulations in 23 CFR 771.105(d) and CEQ's CFR 1502.14(f) call for the consideration of mitigation for adverse impacts. Mitigation should be identified for adverse impacts disclosed in the environmental document, whether direct, indirect, or cumulative. FHWA, is directed to mitigate for impacts that "actually result from the Administration action and represent a reasonable public expenditure after considering the impacts of the action and the benefits of the proposed mitigation measures. In making this determination, the Administration will consider, among other factors, the extent to which the proposed measures would assist in complying with a Federal statute, Executive Order, or Administration regulation or policy." 23 CFR 771.105(d)

For more information about presenting mitigation, see CEQ's discussion of mitigation in *NEPA 's Forty Most Asked Questions* (nos. 19a and 19b) In summary, 19 (a) discusses consideration of impacts not "significant" in themselves, but "significant" in combination with other effects. Question 19 (b) discusses how mitigation measures outside the jurisdiction of the lead or cooperating agency or unlikely to be adopted or enforced by the responsible agency should be dealt with.[ii]

Although WSDOT does not mitigate for cumulative impacts caused by others, and there exists no regulatory requirement for an agency to do so, we do need to disclose the impact and describe mitigation that may be planned or suggest possible mitigation to those agencies responsible. If practical mitigation options exist, we need to determine whether such options are within the control of WSDOT or FHWA. This is a key point: In cumulative effects analyses you do not have to commit to compensatory mitigation for actions that are not part of the proposed project – but you do have to discuss it.

For example, mitigation measures for air quality impacts might require numerous local communities to modify their comprehensive plans to reduce the amount of planned development and reduce the number of vehicle miles traveled within the geographic study area. WSDOT and FHWA do not have the authority to implement the necessary planning decisions, obtain local legislative approvals, or change the regional distribution of future development. Therefore, disclosure of mitigation for cumulative impacts is not based on or limited to specific mitigation measures that can be implemented by the lead agency.

In Step 8, you should consider <u>all</u> avoidance and minimization measures that are planned or in place to benefit the affected resource. Some of these measures may be part of the proposed project, others may be actions taken by other entities.

Consider the effects of any statewide initiatives such as the removal of fish passage barriers. Partnering opportunities, not associated with a project, for retrofitting or similar regional efforts could also produce some benefits to be considered. See discussion in "Recommended Approach". If it is not possible to identify a mitigation measure, the discussion may consist of listing the agencies that have regulatory authority over the resource and recommending actions those agencies could take to influence the sustainability of the resource. By doing so, the needed mitigation would be disclosed to the public and reviewing agencies even though it could not be implemented by FHWA or WSDOT. Once disclosed, the information could be used to influence future decisions or to help identify opportunities for avoidance and minimization when other projects are proposed.

Using the 8-Step Approach: A Hypothetical Example

To assess the potential for cumulative impacts, the practitioner determines the potential for past trends and current and reasonably foreseeable future actions, in combination with the proposed project, that affect the health of the resource.

Below is a brief outline of how to use the steps, with a hypothetical example for wetlands:

Step 1: The project will have direct or indirect impacts to wetlands; therefore, wetlands are included in the resources to consider for cumulative impacts assessment.

Step 2: Based on consultation with environmental biologists and wetlands specialist, you determine that the relevant resource study area (RSA) is the drainage basin.

Step 3: The context: Currently the area is being used for some farming and rural housing, and has relatively intact wetland complexes. The urban growth boundary has recently been moved and now includes this area. Current resource study area acreage: 1,000 acres. Historically (pre-settlement), the area contained abundant wetlands. The wetlands have been disturbed by agricultural activities over the past 150 years. In recent years, urban development has increased the pace of wetland loss. The trend: Rapid development is continuing, and is expected to accelerate over the next 20 years.

Step 4: This project will have two acres of direct and indirect impacts to wetlands in the Resource Study Area.

Step 5: You have identified reasonably foreseeable actions in the wetlands Resource Study Area, and the associated impact to wetlands. These reasonably foreseeable actions include two new housing developments, a new business park, and several transportation improvements. Based on available environmental documents, discussions with wetlands experts, and other information you have collected about these actions, you estimate that 200 acres of wetlands will be adversely affected by reasonably foreseeable actions.

Step 6: You used a trends method to analyze the cumulative effects on the wetlands loss over time. You also consulted with environmental biology staff and regulatory experts to analyze the effect of cumulative stresses (fragmentation, pollution, sedimentation) to the values and functions of wetlands in the Resource Study Area.

Step 7: You concluded that there will be substantial cumulative impacts to wetlands within the Resource Study Area given past, current, and reasonably foreseeable actions. Your analysis shows that your project will account for two acres of the 200 acres of potential cumulative impacts to wetland. You conclude that the wetland impacts associated with your project will contribute minimally to the impacts of other current and reasonably foreseeable projects.

Step 8: Based on your analysis of the status of wetlands in the Resource Study Area, you recommend that compensatory mitigation for the direct and indirect project impacts be near existing wetland mitigation areas or wildlife refuges. If practicable options for cumulative effects mitigation exist, disclose them and suggest possible mitigation to those agencies responsible. Remember to include in your disclosure any avoidance and minimization that has been done.

Background: Resources and More

Following are definitions for some of the more important terms used in this guidance, a summary of applicable case law, a comparison of the WSDOT eight steps with CEQ's guidance and references.

Context

> "This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short and long-term effects are relevant." (40 CFR §1508.27 (a))

Cumulative impacts

> "...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR §1508.7)

Direct impacts

> "Direct impacts are caused by the action and occur at the same time and place." (40 CFR § 1508.8a).
>
> The terms "effect" and "impact" are used synonymously in the CEQ regulations and in this guidance paper.

Indirect impacts

> "Indirect impacts are caused by the action and are later in time and farther removed in distance, but are still reasonably foreseeable. Indirect impacts may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate and related effects on air and water and other natural systems, including ecosystems." (40 CFR § 1508.8(b))

The term "secondary" impact does not appear in the CEQ regulations or guidance. It is used in FHWA's Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (April 1992). FHWA uses the term "indirect" impacts synonymously with "secondary" impacts. For the purpose of this guidance we use the term "indirect."

Intensity

This refers to the severity of a proposed action's impact on the environment. CEQ NEPA Regulations (40 CFR § 1508.27(b)) list several factors to consider. Context and intensity are considered together in determining the significance of an impact (the more sensitive the environmental context, the less intense an impact needs to be to have a potentially significant effect).

Mitigation

Mitigation according to 40 CFR § 1508.20, includes: a) Avoiding the impact b) Minimizing impacts by limiting the degree or magnitude, c) Rectifying the impact by repairing, rehabilitating or restoring d) Reducing or eliminating the impact over time e) Compensating by replacing or providing substitute resources.

Reasonably foreseeable

An action is reasonably foreseeable if it is considered "likely to occur" and isn't too "speculative." EPA's Consideration of Cumulative Impacts in EPA Review of NEPA Documents (May, 1999) states that "Court decisions . . . have generally concluded that reasonably foreseeable future actions need to be considered even if they are not specific proposals. The criterion for excluding future actions is whether they are "speculative." The NEPA document should include discussion of future actions to be taken by the action agency. The analysis should also incorporate information based on the planning documents of other federal agencies, and state and local governments. For example, projects included in a 5-year budget cycle might be considered likely to occur while those only occurring in 10-25 year strategic planning would be less likely and perhaps even speculative."

Language from court decisions can be helpful in formulating questions and criteria as practitioners proceed with analysis to determine which actions may be reasonably foreseeable. For example, one court case defined "reasonably foreseeable" as an action that is "sufficiently likely to occur, that a person of ordinary prudence would take it into account in making a decision." *Sierra Club v. Marsh,* 976 F.2d 763, 767 (1st Cir. 1992) (Sierra Club IV). Courts have also recognized that "An environmental impact is considered 'too speculative' for inclusion in an EIS (Environmental Impact Statement) if it cannot be described at the time the EIS is drafted with sufficient specificity to make its consideration useful to a reasonable decision maker." *Dubois v. US. Dept. of Agriculture,* 102 F.3d 1273, 1286 (1st Cir. 1996).

Factors that indicate whether an action or project is "reasonably foreseeable" for the purposes of cumulative impacts analysis include: whether the project has been federally approved; whether there is funding pending before any agency for the project; and whether there is evidence of active preparation to make a decision on alternatives to the project. *Clairton Sportsmen's Club v. Pennsylvania Turnpike Commission,* 882 *F.* Supp 455 (W.D. Pa 1995).

Resource Study Area

A Resource Study Area is specific for each resource and focused on the area where cumulative effects on the resource are expected to occur. It may be the same or larger than the study area for direct and indirect effects.

Significance

The significance of a potential impact on the natural or built environment depends upon context, setting, likelihood of occurrence, and severity, intensity, magnitude, or duration of the impact. Almost every transportation project that would be recognized as major federal action, no matter how limited in scope, has some adverse impact on the environment.

Review and consideration of case law can help clarify interpretations of the term "significance. In deciding whether a project will significantly impact the environment, case law suggests that agencies should review the proposed action in light of the extent to which the action will cause adverse environmental effects in excess of those created by existing uses in the affected area and the absolute quantitative adverse environmental effects of the action itself, including the cumulative harm. In any proposed major federal action[9], the public must have an opportunity to submit factual information on this issue which might bear on the department's threshold decision of significance. *Hanley v. Kleindienst*, 471 F.2d 823 (2nd Cir. 1972, cert. denied, 412 U.S. 908 (1973). If you are concerned about the role that the level of significance and controversy may have, you should consult your Attorney General's office or other legal counsel.

Discussion of case law

Case law provides some guidance on the standards that must be met with regard to cumulative impacts. NEPA analyses must include useful evaluation of the cumulative impacts of past, present, and future projects., In *Carmel-by-the-Sea v. U.S. Dep't of Transp.*, 123 F.3d 1142, 1160 (9th Cir.1997), the Ninth Circuit found that this means the environmental analysis must evaluate the combined effects of past, present and future projects in sufficient detail to be "useful to the decision maker in deciding whether, or how, to alter the program to lessen cumulative impacts." *See also Neighbors of Cuddy Mountain v. U.S. Forest Service*, 137 F.3d 1372, 1379-80 (9th Cir.1998) ("To 'consider' cumulative effects, some quantified or detailed information is required. . . . General statements about 'possible' effects and 'some risk' do not constitute a 'hard look' absent a justification regarding why more definitive information could not be provided.").

The *Carmel-by-the-Sea* court acknowledged that the EIS considered the impacts in the individual resource discussions and in a separate section, but noted that the analyses were "not lengthy, and taken either separately or together" they failed to satisfy NEPA. 123 F.3d at 1160. The critical component missing from the analysis was how the past and future projects interact with the present project to cumulatively impact the area resources.

A cumulative impact analysis should identify the area in which the effects of the proposed project will be felt; the impacts that are expected in that area from the proposed project; other actions - past, present, and proposed, and reasonably foreseeable - that have or are expected to have impacts in the

[9] "Major Federal action" includes actions with effects that may be major and which are potentially subject to Federal control and responsibility. **40 CFR 1508.18**

same area; the impacts or expected impacts from these other actions; and the overall impact that can be expected if the individual impacts are allowed to accumulate. *Grand Canyon Trust v. Federal Aviation Admin.*, 290 F.3d 339 (D.C. Cir 2002); *Fritiofson v. Alexander*, 772 F.2d 1225 (5th Cir. 1985).

In *Fritiofson* the court stated that "the CEQ regulations [indicate] that a meaningful cumulative-effects study must identify: (1) the area in which effects of the proposed project will be felt; (2) the impacts that are expected in that area from the proposed project; (3) other actions--past, proposed, and reasonably foreseeable--that have had or are expected to have impacts in the same area; (4) the impacts or expected impacts from these other actions; and (5) the overall impact that can be expected if the individual impacts are allowed to accumulate. *Fritiofson v. Alexander*, 772 F.2d at 1245.

Differences between Washington's and CEQ's guidance

Many of you are familiar with the CEQ 11 steps for cumulative effects analyses. We have adopted the 8 steps that TxDOT and Caltrans use. Below is a table comparing the two approaches to show how these fewer steps are still inclusive of the CEQ steps.

Comparison between WA steps and CEQ steps for Cumulative Effects

WSDOT steps	CEQ steps
#1	1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.
#2	2. Establish the geographic scope for the analysis
#2	3. Establish the timeframe for the analysis
#5	4. Identify other actions affecting the resources, ecosystems and human communities of concern.
#3	5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stresses.
#3, 4, **5**, 6	6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.
#3	7. Define a baseline condition for the resources, ecosystems, and human communities.
#6	8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.
#4,**6**, 7	9. Determine the magnitude and significance of cumulative effects.
#6,**8**	10. Modify or add alternatives to avoid, minimize or mitigate significant cumulative effects.
* no comparable step	11. Monitor the cumulative effects of the selected alternative and adapt management.

* At the project level, this step is not practical but we will continue to improve monitoring at the statewide level through our environmental management system. Additionally, a review of case law shows that no agency has been held accountable for this step.

** Bolded WSDOT steps indicate the majority is covered by that step. Some other(s) steps are covered as well.

What references did we use?

CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS)
Guidance for Preparers of Cumulative Impact Analysis Approach and Guidance (2005)
http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm

COUNCIL ON ENVIRONMENTAL QUALITY
Considering Cumulative Effects under the National Environmental Policy Act (1997)
http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm
Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (2005)
http://ceq.eh.doe.gov/nepa/regs/Guidance_on_CE.pdf

ENVIRONMENTAL PROTECTION AGENCY
Consideration of Cumulative Impacts in EPA Review of NEPA Documents (1999)
http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm

FEDERAL HIGHWAY ADMINISTRATION
Question and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process. (Interim Guidance, January 2003)
http://www.environment.fhwa.dot.gov/projdev/qaimpact.asp

MARYLAND STATE HIGHWAY AGENCY
Secondary Cumulative Effects (SCEA) Analysis (2000)
http://www.sha.state.md.us/
http://www.sha.state.md.us/improvingourcommunity/oppe/scea/other/6-28-00Guidelines.pdf

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP)
Report 466: *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* (2002)

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Indirect and Cumulative Impacts Guidance
http://www.ncdot.org/doh/preconstruct/pe/ICI_Guidance.html

TEXAS DEPARTMENT OF TRANSPORTATION
*Guidance on Preparing Indirect and Cumulative Impact Analyses, (*December 2006)
http://www.dot.state.tx.us/services/environmental_affairs/default.htm

END NOTES:

[i] The objective of most Delphi applications is the reliable and creative exploration of ideas or the production of suitable information for decision making. The Delphi Method is based on a structured process for collecting and distilling knowledge from a group of experts by means of a series of questionnaires interspersed with controlled opinion feedback (http://www.iit.edu/~it/delphi.html)

[ii] CEQ's discussion of mitigation in *NEPA's 40 Most Asked Questions,* no. 19a and b.

Mitigation Measures. What is the scope of mitigation measures that must be discussed?

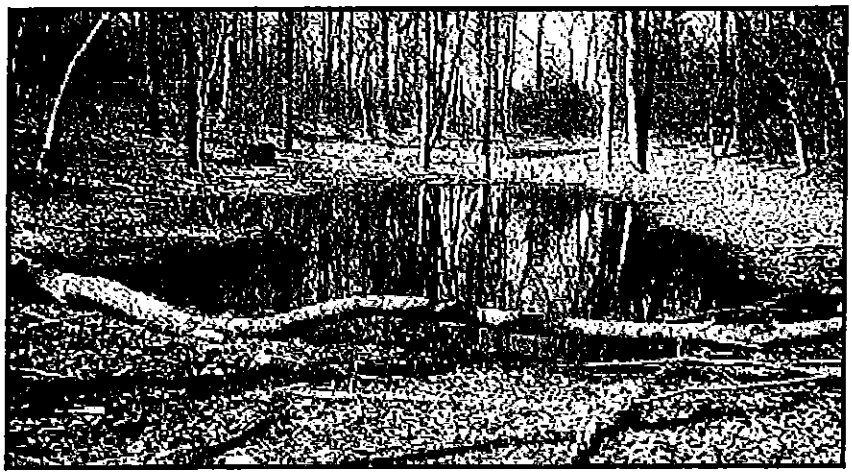
19 a. The mitigation measures discussed in an EIS must cover the range of impacts of the proposal. The measures must include such things as design alternatives that would decrease pollution emissions, construction impacts, esthetic intrusion, as well as relocation assistance, possible land use controls that could be enacted, and other possible efforts. Mitigation measures must be considered even for impacts that by themselves would not be considered "significant." Once the proposal itself is considered as a whole to have significant effects, all of its specific effects on the environment (whether or not "significant") must be considered, and mitigation measures must be developed where it is feasible to do so. Sections 1502.14(f), 1502.16(h), 1508.14.

19b. How should an EIS treat the subject of available mitigation measures that are (1) **outside the jurisdiction** of the lead or cooperating agencies, or (2) **unlikely** to be adopted or enforced by the responsible agency?

A. All relevant, reasonable mitigation measures that could improve the project are to be identified, even if they are outside the jurisdiction of the lead agency or the cooperating agencies, and thus would not be committed as part of the RODs of these agencies. Sections 1502.16(h), 1505.2(c). This will serve to [46 FR 18032] alert agencies or officials who can implement these extra measures, and will encourage them to do so. Because the EIS is the most comprehensive environmental document, it is an ideal vehicle in which to lay out not only the full range of environmental impacts but also the full spectrum of appropriate mitigation.

However, to ensure that environmental effects of a proposed action are fairly assessed, the probability of the mitigation measures being implemented must also be discussed. Thus the EIS and the Record of Decision should indicate the likelihood that such measures will be adopted or enforced by the responsible agencies. Sections 1502.16(h), 1505.2. If there is a history of non-enforcement or opposition to such measures, the EIS and Record of Decision should acknowledge such opposition or non-enforcement. If the necessary mitigation measures will not be ready for a long period of time, this fact, of course, should also be recognized.)

Buffer Zones and Beyond



Wildlife use of Wetland Buffer Zones and their Protection under the Massachusetts Wetland Protection Act

Lynn Boyd
Wetland Conservation Professional Program
Department of Natural Resources Conservation
University of Massachusetts
July, 2001

CONCLUSIONS and RECOMMENDATIONS

Current wetland regulations are inadequate for protecting wildlife dependent on upland areas adjacent to wetlands. There are 65 wetland dependent species in Massachusetts that are also dependent on the upland. The current Massachusetts State regulations do not provide all habitat elements required by these species for survival and reproduction. Without protecting both the wetland and essential portions of the upland we are not providing full protection to wetland wildlife habitat.

The direct and active protection of the 100 ft. regulated buffer zone would provide some protection to 77% of those species that require upland habitat in addition to those elements provided by the wetland. Protection of this area would also serve to provide protection of the integrity of the wetland itself in terms of water quality. There is an additional need to provide protection to areas beyond the 100 ft. because 52% of MA wetland dependent wildlife are dependent on areas beyond 200 ft.

Currently the 200 ft. riverfront area is provided direct and full protection for wildlife habitat. The riverfront area is considered important to maintaining the integrity of the river itself. This same argument can be made for the wetland buffer zone, although it is not currently offered full protection. Without protecting the adjacent upland to the wetland, the wetland community is drastically changed. The wetland becomes isolated and is unable to support the ecologically diverse community that is possible with protected upland areas.

Some towns within Massachusetts have taken steps to provide additional protection to wetlands through the establishment of local by-laws that protect the regulated buffer zone. A town can enforce by-laws that provide additional protection and are stricter than the state regulations. Section 3A of the North Andover town by-laws regulates all activities in the buffer zone requiring a Notice of Intent to be filed with the conservation commission for projects within the buffer zone. Some towns extend their protection further and completely protect the 100 ft. buffer from building. The wetland by-law for

the town of Blackstone requires a NOI for any work within the regulated buffer and a 100 ft. setback from a wetland edge for any building.

In many cases towns lack sufficient information to develop additional by-laws. Information on species use of the upland provides towns with the justification to change by-laws and increase the restrictions within buffer zones and the distances that are protected in addition to requirements by the state of Massachusetts.

There is a need for more information to assist in the creation of adequate upland protection. More studies that examine not only the maximum width of protected upland but also the percentages of nesting animals within specific distances would be valuable. This type of information could be used to optimize regulated buffer widths from both economic and conservation perspectives. There are also information gaps on the use of the upland and distances traveled by particular species. There are a total of 15 species included in the unknown category due to this lack of information.

If protection of wetland dependent wildlife habitat is an objective of the Massachusetts Wetland Protection Act, a re-examination and re-evaluation of the regulations are essential. A focused and adaptable element of wildlife habitat protection from a landscape perspective, including connectivity and adjacent land use, is necessary.

APPENDIX B

Wetland Buffer Zones Species List

WETLAND BUFFER ZONES SPECIES LIST

REPTILES - 9 species

Spotted Turtle	*Clemmys guttata*
Common Snapping Turtle	*Chelydra s. serpentina*
Common Musk Turtle	*Sternotherus odoratus*
Wood Turtle	*Clemmys insculpta*
Blanding's Turtle	*Emydoidea blandingii*
Painted Turtle	*Chrysemys picta*
Plymouth Redbelly Turtle	*Pseudemys rubriventris bangsi*
Ribbon Snake	*Thamnophis sauritus*
Northern Water Snake	*Nerodia s. sipedon*

AMPHIBIANS - 19 species

American Toad	*Bufo a. americanus*
Dusky Salamander	*Desmognatuhus fuscus*
Two-lined Salamander	*Eurycea bislineata*
Fowler's Toad	*Bufo fowleri*
Green Frog	*Rana clamitans melanota*
Northern Spring Salamander	*Gyrinophilus p. porphyriticus*
Bullfrog	*Rana catesbeiana*
Red-Spotted Newt	*Notophthalmus v. viridescens*
Spotted Salamander	*Ambystoma maculatum*
Four-Toed Salamander	*Hemidactylium scutatum*
Marbled Salamander	*Ambystoma opacum*
Jefferson Salamander	*Ambystoma jeffersonianum*
Blue-Spotted Salamander	*Ambystoma laterale*
Grey Treefrog	*Hyla versicolor*
Spring Peeper	*Pseudacris c. crucifer*
Wood Frog	*Rana sylvatica*
Spadefoot Toad	*Scaphiopus holbookii*
Northern Leopard Frog	*Rana pipiens*
Pickerel Frog	*Rana palustris*

WETLAND BUFFER ZONES SPECIES LIST

MAMMALS - 14 species

River Otter	*Lutra canadensis*
Muskrat	*Ondatra zibethicus*
Beaver	*Castor canadensis*
Mink	*Mustela vison*
Masked Shrew	*Sorex cinereus*
Little Brown Myotis	*Myotis lucifugus*
Silver-haired Bat	*Lasionycteris noctivagens*
Eastern Pipistrelle	*Pipistrellus subflavus*
Keen's Myotis	*Myotis keenii*
Small-footed Myotis	*Myotis leibii*
Meadow Jumping Mouse	*Zapus hudsonius*
Water Shrew	*Sorex palustris*
Star-Nosed Mole	*Condylura cristata*
Smoky Shrew	*Sorex fumeus*

BIRDS - 23 species

Herring Gull	*Larus argentatus*
Hooded Merganser	*Lophodytes cucullatus*
Mallard	*Anas platyrhynchos*
American Black Duck	*Anas rubripes*
Gadwall	*Anas strepera*
Green -winged Teal	*Anas discors*
Blue-winged Teal	*Anas crecca*
Northern Pintail	*Anas acuta*
Wood Duck	*Aix sponsa*
Canada Goose	*Branta canadensis*
Great Blue Heron	*Ardea herodias*
Great Egret	*Casmerodius albus*
Common Snipe	*Capella gallinago*
Spotted Sandpiper	*Actitis macularia*
Bald Eagle	*Haliaeetus leucocephalus*
Osprey	*Pandion haliaetus*
Belted Kingfisher	*Megaceryle alcyon*
Tree Swallow	*Iridoprocne bicolor*
Bank Swallow	*Riparia riparia*
Northern Rough-winged Swallow	*Stelgidopteryx ruficollis*
Northern Waterthrush	*Seiurus noveboracensis*
Louisiana Waterthrush	*Seiurus motacilla*
Canada Warbler	*Wilsonis canadensis*

NH METHOD ELECTRONIC DATA SHEETS

These electronic Excel data sheets allow the NH Method user to enter the data quickly and efficiently.
Average functional scores are calculated automatically and stored in the Score Summary sheet.

Do not modify the tab labeled "Template". This template is needed each time you need to create additional wetland tabs/spreadsheets.

How to use these data sheets

1. If you have already completed the paper NH Method data sheets, you can enter your data onto the electronic Excel spreadsheet Functional Scores will automatically be added to the Score Summary sheet.

2. If you are very familiar with the NH Method questions and criteria, you can take this abbreviated form into the field with you and enter the scores for each field-based question manually. Later you can add this data to the electronic spreadsheet.

3. If you have a portable electronic device, you may prefer to complete the electronic data sheets in the field as you are conducting field evaluation of wetlands.

How to edit the electronic data sheets

1. Change wetland name

a. Go to a Wetland Tab.
b. To change the name of the tab to the wetland name or code, right click on the tab and select RENAME.
c. Type the new name in. Do the same for subsequent wetlands

2. Add additional wetlands

a. Right click on the template tab and select " Move or Copy" .
b. Check "create a copy" and click OK. A new tab called Template (2) will appear to the left.
c. Rename the table - right click and select Rename.
d. To move the tab, move the arrow cursor over the tab, hold the left mouse button down and drag the tab to where you want it, e.g. after the last named wetland tab.
e. Do the same to add any additional wetland tabs.
f. To change the tab color, right click on the tab, select "tab color" and select color. The "no color" option
g. In the tabs that you added, you will need to code the Flood Storage Score so it picks up the score from the Flood Storage tab.
   Go to the wetland functions worksheet for the first wetland you added and click on the cell for the Flood Control Score.
   Type an = sign in that cell, then go to the Flood Storage worksheet and click on the Flood Index score for that wetland.
   Hit "enter" and that will link the information to the wetland functions worksheet.

f. In the Score Summary Sheet, add additional columns for corresponding to the wetland names added. To ensure the Functional Scores get carried over to the Summary Sheet, follow these instructions:
   Go to the summary score worksheet and click on the Ecological Integrity cell for the first wetland added.
   Type an = sign, then go to the wetland worksheet you added, click on cell 17 B (Ecological Integrity Score)
   Hit "enter" and that will link the information to the summary score worksheet. Do the same for the remaining functions.

Wetland name/code	*ND1*	*Coldrain Pond*	**Date Evaluated:**	*6/17/2010*
Wetland area (acres)	*xx*		**Evaluated by:**	*Amanda Stone*
Watershed area (acres)	*xxx*			

Do not enter data into cells highlighted in blue. These cells contain formulas that automatically carry data over from function to function, or total and average functional scores.

1. ECOLOGICAL INTEGRITY	Score	10	5	1	0	Notes
1. Water quality (sediment/nutrients)?		No sources	1-2 sources	> 3 sources		
2. Fill in Wetland?		Less than 1%	1-3%	3%		
3. Agriculture in wetland?		Less than 5%	5-25%	> 25%		
4. Logging activity in wetland?		Less than 1%	1-10%	> 10%		
5. Human activity in wetland?		Low	Moderate	High		
6. Invasive plants in wetland?		< 5%	5-30%	>30%		
7. Road/driveway/railroad crossings?		None	One	Two or more		
8. Human activity in upland?		Low	Moderate	High		
9. Buildings within 500 ft?		> 50 acres/bldg	11-50 acres/bldg	< 10 acres/bldg		
10. Water level control structure?		None	Bridge/culvert >10 ft	Culvert <10'/clogged	No stream	
Average Score - Ecological Integrity	**0.0**					

2. WETLAND WILDLIFE HABITAT	Score	10	5	1	0	Notes
1. Wetland acres?		> 100 acres	20-100 acres	<20 acres		
2. Ecological Integrity Avg. score?	0.0					
3. Water quality (Use F1, Q1 score)?	0.0					
4. Open water < 6.6ft deep?		> 3 acres	0.5 - 3 acres	< 0.5 acre		
5. Deepwater Habitats?		stream ≥ 1 mile or lake/pond ≥10acre	stream < 1 mile or lake/pond <10acre		No deepwater	
6. Wetland vegetation class diversity?		3 or more classes	2 classes	1 class		
7. Proximity to other wetlands?		connected/unconnected within 0.25 mile	connected 0.5-1mi. Or unconnected 0.25-0.5 mi.	Not connected or > 0.5 mi. from unconnected		
8. Wildlife travel corridors?		Free access	Access partially blocked	Access blocked		
9. % of wetland edge undisturbed?		>95%	75-95%	< 75%		
10. Invasive plants (Use F1, Q6 score)	0.0					
Average Score - Wildlife Habitat	**0.0**					

3. FISH & AQUATIC HABITAT	Score	10	5	1	0	Notes
1. Dominant land use in watershed?		Woodland, wetland, inactive	Active farm/rural res	Urban & heavily developed		
		farmland				
2. Water Quality? (use F1, Q1 score)	0.0					
3. Open water?(use F2, Q4 score)	0.0					
4. Deepwater habitats > 6.6 ft deep?		> 100 acres	10-100 acres	< 10 acres	Not present	
5. Stream width in wetland?		> 50 ft	25-50 ft	< 25 ft	Not present	
6. Alteration of stream channel?		Natural channel / low gradient or steep gradient w/ riffles	Recently modified or formerly channelized	Recently channelized or stream in non-vegetated chute/pipe	Not present	

7. Diversity of substrate types?		4 or more substrates	2-3 substrates	1 substrate		
8. Coarse woody material and large rocks?		> 10% of cover in water	< 10% of cover in water	No visible cover	No open water	
9. Floating & submerged vegetation?		> 70% cover in water	30-70% cover in water	< 30% cover	No open water	
10. Barriers to aquatic life?		No barriers	Artificial barrier with provision for passage	Barrier with no provision for passage	No open water	
11. Rare or endangered fish or aquatic life?		Documented occurrence in or near wetland	Documented occurrence within 1/2 mi. & suitable habita	No documented occurrence in 1/2 mi. but suitable habitat	No occurrence & no suitable habitat	
Average Score - Fish & Aquatic Habitat	**0.0**					

4. SCENIC QUALITY	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wetland vegetation classes visible?		≥ 3 classes	2 classes	1 class		
2. Public access?		Public access & trails/road	Public access; no trails	No public access		
3. Visible extent across wetland?		Large expanse	Somewhat restricted view	Forested; no view		
4. Open water visible?		> 3 acres	1-3 acres	< 1 acre		
5. Visual contrast with landforms?		High level of contrast	Some visual contrast	Little contrast or developed		
6. Diversity of plants (flowers, fall color)?		High level of diversity	Moderate level diversity	Low or no diversity		
7. General appearance of wetland?		Undisturbed & natural	Minor visual detractors	Severe visual detractors		
Average Score - Scenic Quality	**0.0**					

5. EDUCATIONAL POTENTIAL	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Ecological Integrity Score?	0.0					
2. Wildlife Habitat Score?	0.0					
3. Public access? (use F4, Q2 score)?	0.0					
4. Adequate parking for 10-15 cars or bus?		< 5 mins from site	10-15 min walk from site	> 15 mins walk / no parking		
5. Wetland vegetation classes accessible?		≥ 3 classes	2 classes	1 class		
6. Access to perennial stream / pond?		Direct water access	Access 5 mins or less	No access or no water		
7. Scenic Quality Score?	0.0					
8. Disabled access		Yes			No	
Average Score - Education	**0.0**					

6. WETLAND RECREATION	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wildlife Habitat Score?	0.0					
2. Open water access (canoes & kayaks)?		Open water & easy access	open water; limited access	No open water or access		
3. Hiking, Fishing, Hunting?		Maintained trails present	Trails but not maintained	No trails		
4. Off-road parking for two or more cars?		< 5 mins from site	5-10 min walk from site	> 10 mins walk or no parking		
5. Scenic Quality Score?	0.0					
Average Score - Wetland Recreation	**0.0**					

7. FLOOD WATER STORAGE	**Score**	**10**	**5**	**1**	**0**	**Notes**
Use separate Flood Storage Index worksheet						

Field work is not needed for this function						
Average Score - Flood Storage	**0.0**					

8. GROUNDWATER	Score	10	5	1	0	Notes
1. Stratified drift aquifer beneath wetland?		Wetland overlies aquifer	Wetland adjacent to aquifer	No aquifer beneath or adjacent		
2. Public water supply area?		Wetland in in Favorable Gravel Well area	Wetland adjacent to Favorable Gravel Well area	No Favorable Gravel Well area		
3. Dominant soil type within 500 ft?		> 50% of Table 3 soils	25-50% of Table 3 soils	< 25% ofTable 3 soils		
Average Score - Groundwater	**0.0**					

9. SEDIMENT TRAPPING	Score	10	5	1	0	Notes
1. Flood Storage Score?	0.0					
2. Wetland outlet?		No outlet	Constricted outlet	Outlet not constricted or flow within stream channel		
3. Shape of stream channel in wetland?		No stream	Sinous channel	Stream channel straight		
4. Wetland to watershed size ratio?		Wetland > 20% of watershed	Wetland 5-20% of watershed	Wetland <5% of watershed		
5. Gradient of wetland?		Gradient < 1% and no outlet	Gradient 1-3%	Gradient > 3%		
6. Dominant vegetation class?		Persistent emergent, foreste scrub-shrub, bogs	Nonpersistent emergents	Open water or Aquatic bed		
7. Wetland vegetation density/distribution?		>90% vegetated & no channels	70-90% vegetated & distributed	21 - 50% distributed	0-20% vegetated	
8. Avg. water depth in growing season?		< 1 ft deep or no open water	> 1 ft deep and < 6.6ft	> 6.6ft deep		
Average Score - Sediment Trapping	**0.0**					

10. NUTRIENTS	Score	10	5	1	0	Notes
1. Flood Storage Score?	0.0					
2. Sediment Trapping Score?	0.0					
3. Dominant vegetation class (use F9, Q8)	0.0					
4. Dominant hydroperiod?		Permanent/semipermanent flooding	Seaonal flooding or Saturate	Saturated / temporarily flooded		
5. Dominant soils in wetland?		Very poorly drained soils and not a peatland	Poorly drained soils with leaf litter or fine sediments	Sand, gravel, boulders, bedrock or peatland		
6. Avg. water depth (use F9, Q10)	0.0					
Average Score - Nutrients	**0.0**					

11. SHORELINE ANCHORING		10	5	1	0	Notes
1. Gradation of wetland vegetation?		≥ 3 vegetation classes	2 wetland classes	1 wetland class		
2. Vegetation density in wetland?		> 90% cover	70-90% cover	< 70% cover		
3. Width of wetland along water body?		> 20 ft	10-20 ft	< 10 ft		
Average Score - Shoreline Anchoring	**0.0**					

12. NOTEWORTHINESS		10	5	1	0	Notes
1. Critical Wildlife Habitat (NH WAP)?		YES			NO	
2. Wetland in/near Highest Ranked Habitat		YES			NO	
(NH WAP)?		YES			NO	
3. Local significance, high scores, Largest		YES			NO	
4. Local or regional significance?		YES			NO	
5. Locally rare/unique biological		YES			NO	
or geological features		YES			NO	
6. Important historic or archaeologic site?		YES			NO	
7. Connected to designated river?		YES			NO	
8. Wetland in urban setting?		YES			NO	
Average Score - Noteworthiness	0.0					

NH Method Summary of Scores

Study area: New Durham

Add qualitative information to rows 6 through 9

Do not add data to Scores columns *- Functional Scores are automatically recorded from data sheets for each wetland*

Wetland name/code	**Wetland 1**	**Wetland 2**	**Wetland 3**	**Wetland 4**	**Wetland 5**	**Wetland 6**	**Wetland 7**	**Wetland 8**	**Wetland 9**	**Wetland 10**
Date Evaluated	6/1/2010	6/1/2010	6/3/2010							
Investigator	A. Tester	A. Tester	A. Tester							
Wetland Acres	109	43	83							
Wetland Functions & Scores										
1. ECOLOGICAL INTEGRITY	8.0	6.9	7.3	0.0	0.0	0.0	0.0	0.0	0.0	7.1
2. WETLAND WILDLIFE HABITAT	7.1	4.4	5.5	0.0	0.0	0.0	0.0	0.0	0.0	1.7
3. FISH & AQUATIC HABITAT	4.3	1.7	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.5
4. SCENIC QUALITY	8.2	6.4	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5. EDUCATIONAL VALUE	6.5	3.9	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.4
6. WETLAND-BASED RECREATION	6.1	4.4	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3
7. FLOODWATER STORAGE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8. GROUNDWATER	6.7	3.7	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9. SEDIMENT TRAPPING	5.3	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10. NUTRIENT TRANSFORMATION	#REF!	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11. SHORELINE ANCHORING	6.3	0.0	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12. NOTEWORTHINESS	20.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

NH Method - Flood Index Worksheet

Date: Reformatted 6/9/09 (A. Stone)

WFV = (V x Afx L) x 10

where:

Maximum Wetland Storage Volume = **200 acre=feet**

Maxiumum Wetland Flood Function Value = **10**

**** "red" headings indicate data input columns***

Gray shading = automated calculations

Do not add data to these columns

Wetland I.D.	Wetland Acreage (acres) (W)	Watershed Acreage (S)	Wetland Area as % of Watershed (P) from Table 2	Watershed Area Factor (A) from Table 2	Location in Watershed (L) (1.0/0.8/0.6)	Water Storage Depth (D) 1.0 = default	Wetland Storage Volume (V) (acre-feet)	Wetland Storage Volume Factor (F) from table1	Flood Index
1			#DIV/0!				0		**0.000**
2			#DIV/0!				0		**0.000**
3			#DIV/0!				0		**0.000**
4			#DIV/0!				0		**0.000**
5			#DIV/0!				0		**0.000**
6			#DIV/0!				0		**0.000**
7			#DIV/0!				0		**0.000**
8			#DIV/0!				0		**0.000**
9			#DIV/0!				0		**0.000**
10			#DIV/0!				0		**0.000**
			#DIV/0!				0		**0.000**
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			#DIV/0!				0		**0.000**
			#DIV/0!				0		**0.000**

Wetland Flood Index Value Tables

2/10/2009

Table A	
Watershed Area factor (Af)	
WeA/WsA x 100	**Af**
≥10%	1.00
9%	0.95
8%	0.90
7%	0.85
6%	0.80
5%	0.75
4%	0.70
3%	0.65
2%	0.60
1%	0.55
< 1%	0.50

Table B	
WSV factor (Vf)	
WSV	**Vf**
≥ 200	1.000
150	0.950
100	0.900
75	0.850
50	0.800
37.5	0.750
25	0.700
18.75	0.650
12.5	0.600
9.375	0.550
6.25	0.500
4.69	0.450
3.125	0.400
2.36	0.350
1.6	0.300
1.2	0.250
0.8	0.200
0.6	0.150
0.4	0.100
0.3	0.075
0.2	0.050
0.15	0.037
0.1	0.025
0.5	0.012
0	0.000

Note: Values for Af and Vf may be approximated between values provided in tables above.

WeA = Wetland Area
WsA = Watershed Are
WFV = Wetland Flood Function Value
WsD = Water Storage Depth
WSV = Wetland Storage Volume
Vf = Wetland Storage Volume factor
Af = Watershed Area factor
Lf = Location factor

Wetland name/code *ND1* *Stream Brook* **Date Evaluated:** *6/17/2010*
Wetland area (acres) *xx* **Evaluated by:** *P. Tester*
Watershed area (acres) *xxx*

NOTE: SAMPLE DATA HAS BEEN ADDED TO WETLAND 1TO SHOW HOW THE SPREADSHEET WORKS

Do not enter data into cells highlighted in blue. These cells contain formulas that automatically carry data over from function to function, or total and average functional scores.

1. ECOLOGICAL INTEGRITY	Score	10	5	1	0	Notes
1. Water quality (sediment/nutrients)?	10.0	No sources	1-2 sources	> 3 sources		
2. Fill in Wetland?	10.0	Less than 1%	1-3%	3%		
3. Agriculture in wetland?	10.0	Less than 5%	5-25%	> 25%		
4. Logging activity in wetland?	10.0	Less than 1%	1-10%	> 10%		
5. Human activity in wetland?	7.5	Low	Moderate	High		
6. Invasive plants in wetland?	5.0	< 5%	5-30%	>30%		
7. Road/driveway/railroad crossings?	5.0	None	One	Two or more		
8. Human activity in upland?	7.5	Low	Moderate	High		
9. Buildings within 500 ft?	5.0	> 50 acres/bldg	11-50 acres/bldg	< 10 acres/bldg		
10. Water level control structure?	10.0	None	Bridge/culvert >10 ft	Culvert <10'/clogged	No stream	
Average Score - Ecological Integrity	**8.0**					

2. WETLAND WILDLIFE HABITAT	Score	10	5	1	0	Notes
1. Wetland acres?	10.0	> 100 acres	20-100 acres	<20 acres		
2. Ecological Integrity Avg. score?	8.0					
3. Water quality (Use F1, Q1 score)?	10.0					
4. Open water < 6.6ft deep?	10.0	> 3 acres	0.5 - 3 acres	< 0.5 acre		
5. Deepwater Habitats?	0.0	stream≥1 mile or lake/pond≥10acre	stream<1 mile or lake/pond <10acre		No deepwater	
6. Wetland vegetation class diversity?	10.0	3 or more classes	2 classes	1 class		
7. Proximity to other wetlands?	5.0	connected/unconnected within 0.25 mile	connected 0.5-1mi. Or unconnected 0.25-0.5 mi.	Not connected or > 0.5 mi. from unconnected		
8. Wildlife travel corridors?	7.5	Free access	Access partially blocked	Access blocked		
9. % of wetland edge undisturbed?	5.0	>95%	75-95%	< 75%		
10. Invasive plants (Use F1, Q6 score)	5.0					
Average Score - Wildlife Habitat	**7.1**					

3. FISH & AQUATIC HABITAT	Score	10	5	1	0	Notes
1. Dominant land use in watershed?	5.0	Woodland, wetland, inactive	Active farm/rural res	Urban & heavily developed		
		farmland				
2. Water Quality? (use F1, Q1 score)	10.0					
3. Open water?(use F2, Q4 score)	10.0					
4. Deepwater habitats > 6.6 ft deep?	1.0	> 100 acres	10-100 acres	< 10 acres	No deepwater	
5. Stream width in wetland?	1.0	> 50 ft	25-50 ft	< 25 ft	No stream	

6. Alteration of stream channel?	10.0	Natural channel / low gradient or steep gradient w/ riffles	Recently modified or formerly channelized	Recently channelized or stream in non-vegetated chute/pipe	No stream	
7. Diversity of substrate types?	1.0	4 or more substrates	2-3 substrates	1 substrate		
8. Coarse woody material and large rocks?	2.5	> 10% of cover in water	< 10% of cover in water	No visible cover	No open water	
9. Floating & submerged vegetation?	1.0	> 70% cover in water	30-70% cover in water	< 30% cover	No open water	
10. Barriers to aquatic life?	5.0	No barriers	Artificial barrier with provision for passage	Barrier with no provision for passage	No open water	
11. Rare or endangered fish or aquatic life?	1.0	Documented occurrence in or near wetland	Documented occurrence within 1/2 mi. & suitable habita	No documented occurrence in 1/2 mi. but suitable habitat	No occurrence & no suitable habitat	
Average Score - Fish & Aquatic Habitat	**4.3**					

4. SCENIC QUALITY	Score	10	5	1	0	Notes
1. Wetland vegetation classes visible?	10.0	≥ 3 classes	2 classes	1 class		
2. Public access?	10.0	Public access & trails/road	Public access; no trails	No public access		
3. Visible extent across wetland?	10.0	Large expanse	Somewhat restricted view	Forested; no view		
4. Open water visible?	10.0	> 3 acres	1-3 acres	< 1 acre		
5. Visual contrast with landforms?	5.0	High level of contrast	Some visual contrast	Little contrast or developed		
6. Diversity of plants (flowers, fall color…)?	5.0	High level of diversity	Moderate level diversity	Low or no diversity		
7. General appearance of wetland?	7.5	Undisturbed & natural	Minor visual detractors	Severe visual detractors		
Average Score - Scenic Quality	**8.2**					

5. EDUCATIONAL POTENTIAL	Score	10	5	1	0	Notes
1. Ecological Integrity Score?	7.1					
2. Wildlife Habitat Score?	7.1					
3. Public access? (use F4, Q2 score)?	10.0					
4. Adequate parking for 10-15 cars or bus?	5.0	< 5 mins from site	10-15 min walk from site	> 15 mins walk / no parking		
5. Wetland vegetation classes accessible?	5.0	≥ 3 classes	2 classes	1 class		
6. Access to perennial stream / pond?	10.0	Direct water access	Access 5 mins or less	Access > 5 mins	No access / water	
7. Scenic Quality Score?	8.2					
8. Disabled access	0.0	Yes			No	
Average Score - Education	**6.5**					

6. WETLAND RECREATION	Score	10	5	1	0	Notes
1. Wildlife Habitat Score?	7.1					
2. Open water access (canoes & kayaks)?	5.0	Open water & easy access	open water; limited access		No open water or access	
3. Hiking, Fishing, Hunting?	5.0	Maintained trails present	Trails but not maintained	No trails		
4. Off-road parking for two or more cars?	5.0	< 5 mins from site	5-10 min walk from site	> 10 mins walk or no parking		
5. Scenic Quality Score?	8.2					
Average Score - Wetland Recreation	**6.1**					

7. FLOOD WATER STORAGE	Score	10	5	1	0	Notes

Use separate Flood Storage Index worksheet Field work is not needed for this function						
Average Score - Flood Storage	**0.0**					

8. GROUNDWATER	Score	10	5	1	0	Notes
1. Stratified drift aquifer beneath wetland?	10.0	Wetland overlies aquifer	Wetland adjacent to aquifer		No aquifer beneath	or adjacent
2. Public water supply area?	5.0	Wetland in in Favorable Gravel Well area	Wetland adjacent to Favorable Gravel Well area	No Favorable Gravel Well area		
3. Dominant soil type within 500 ft?	5.0	> 50% of Table 3 soils	25-50% of Table 3 soils	< 25% ofTable 3 soils		
Average Score - Groundwater	**6.7**					

9. SEDIMENT TRAPPING	Score	10	5	1	0	Notes
1. Flood Storage Score?	0.0					
2. Wetland outlet?	1.0	No outlet	Constricted outlet	Outlet not constricted or flow within stream channel		
3. Shape of stream channel in wetland?	1.0	No stream	Sinous channel	Stream channel straight		
4. Wetland to watershed size ratio?	10.0	Wetland > 20% of watershed	Wetland 5-20% of watershed	Wetland <5% of watershed		
5. Gradient of wetland?	5.0	Gradient < 1% and no outlet	Gradient 1-3%	Gradient > 3%		
6. Dominant vegetation class?	10.0	Persistent emergent, foreste scrub-shrub, bogs	Nonpersistent emergents	Open water or Aquatic bed		
7. Wetland vegetation density/distribution?	5.0	>90% vegetated & no channels	70-90% vegetated & distributed	21 - 50% distributed	0-20% vegetated	
8. Avg. water depth in growing season?	10.0	< 1 ft deep or no open water	> 1 ft deep and < 6.6ft	> 6.6ft deep		
Average Score - Sediment Trapping	**5.3**					

10. NUTRIENTS	Score	10	5	1	0	Notes
1. Flood Storage Score?	0.0					
2. Sediment Trapping Score?	5.3					
3. Dominant vegetation class (use F9, Q8)	#REF!					
4. Dominant hydroperiod?	10.0	Permanent/semipermanent flooding	Seaonal flooding or Saturate	Saturated / temporarily flooded		
5. Dominant soils in wetland?	7.5	Very poorly drained soils and not a peatland	Poorly drained soils with leaf litter or fine sediments	Sand, gravel, boulders, bedrock or peatland		
6. Avg. water depth (use F9, Q8)	10.0					
Average Score - Nutrients	**#REF!**					

11. SHORELINE ANCHORING		10	5	1	0	Notes
1. Gradation of wetland vegetation?	5.0	≥ 3 vegetation classes	2 wetland classes	1 wetland class		
2. Vegetation density in wetland?	5.0	> 90% cover	70-90% cover	< 70% cover		

3. Width of wetland along water body?	10.0	> 20 ft	10-20 ft	< 10 ft		
4. % of wetland edge undisturbed?	5.0	> 95%	75-95%	< 75%		
Average Score - Shoreline Anchoring	**6.3**					

12. NOTEWORTHINESS		**10**	**5**	**1**	**0**	**Notes**
1. Critical Wildlife Habitat (NH WAP)?	10.0	YES			NO	
2. Wetland in/near Highest Ranked Habitat	10.0	YES			NO	
(NH WAP)?		YES			NO	
3. Local significance, high scores, Largest		YES			NO	
4. Local or regional significance?		YES			NO	
5. Locally rare/unique biological		YES			NO	
or geological features		YES			NO	
6. Important historic or archaeologic site?		YES			NO	
7. Connected to designated river?		YES			NO	
8. Wetland in urban setting?		YES			NO	
Average Score - Noteworthiness	**20.0**					

Wetland name/code *ND1* *Coldrain Pond* **Date Evaluated:** *6/17/2010*
Wetland area (acres) *xx* **Evaluated by:** *Amanda Stone*
Watershed area (acres) *xxx*

Do not enter data into cells highlighted in blue. These cells contain formulas that automatically carry data over from function to function, or total and average functional scores.

1. ECOLOGICAL INTEGRITY	Score	10	5	1	0	Notes
1. Water quality (sediment/nutrients)?	7.5	No sources	1-2 sources	> 3 sources		
2. Fill in Wetland?	10.0	Less than 1%	1-3%	3%		
3. Agriculture in wetland?	10.0	Less than 5%	5-25%	> 25%		
4. Logging activity in wetland?	10.0	Less than 1%	1-10%	> 10%		
5. Human activity in wetland?	5.0	Low	Moderate	High		
6. Invasive plants in wetland?	5.0	< 5%	5-30%	>30%		
7. Road/driveway/railroad crossings?	1.0	None	One	Two or more		
8. Human activity in upland?	5.0	Low	Moderate	High		
9. Buildings within 500 ft?	5.0	> 50 acres/bldg	11-50 acres/bldg	< 10 acres/bldg		
10. Water level control structure?	10.0	None	Bridge/culvert >10 ft	Culvert <10'/clogged	No stream	
Average Score - Ecological Integrity	**6.9**					

2. WETLAND WILDLIFE HABITAT	Score	10	5	1	0	Notes
1. Wetland acres?	5.0	> 100 acres	20-100 acres	<20 acres		
2. Ecological Integrity Avg. score?	6.9					
3. Water quality (Use F1, Q1 score)?	7.5					
4. Open water < 6.6ft deep?	5.0	> 3 acres	0.5 - 3 acres	< 0.5 acre		
5. Deepwater Habitats?	0.0	stream ≥ 1 mile or lake/pond ≥ 10acre	stream < 1 mile or lake/pond <10acre	No deepwater		
6. Wetland vegetation class diversity?	5.0	3 or more classes	2 classes	1 class		
7. Proximity to other wetlands?		connected/unconnected within 0.25 mile	connected 0.5-1mi. Or unconnected 0.25-0.5 mi.	Not connected or > 0.5 mi. from unconnected		
8. Wildlife travel corridors?	5.0	Free access	Access partially blocked	Access blocked		
9. % of wetland edge undisturbed?	5.0	>95%	75-95%	< 75%		
10. Invasive plants (Use F1, Q6 score)	5.0					
Average Score - Wildlife Habitat	**4.4**					

3. FISH & AQUATIC HABITAT	Score	10	5	1	0	Notes
1. Dominant land use in watershed?	5.0	Woodland, wetland, inactive	Active farm/rural res	Urban & heavily developed		
		farmland				
2. Water Quality? (use F1, Q1 score)	7.5					
3. Open water?(use F2, Q4 score)	5.0					
4. Deepwater habitats > 6.6 ft deep?	0.0	> 100 acres	10-100 acres	< 10 acres	Not present	
5. Stream width in wetland?	0.0	> 50 ft	25-50 ft	< 25 ft	Not present	
6. Alteration of stream channel?	0.0	Natural channel / low gradient or steep gradient w/ riffles	Recently modified or formerly channelized	Recently channelized or stream in non-vegetated chute/pipe	Not present	

7. Diversity of substrate types?	1.0	4 or more substrates	2-3 substrates	1 substrate		
8. Coarse woody material and large rocks?	0.0	> 10% of cover in water	< 10% of cover in water	No visible cover	No open water	
10. Barriers to aquatic life?	0.0	No barriers	Artificial barrier with provision for passage	Barrier with no provision for passage	No open water	
9. Floating & submerged vegetation?	0.0	> 70% cover in water	30-70% cover in water	< 30% cover	No open water	
11. Rare or endangered fish or aquatic life?	0.0	Documented occurrence in or near wetland	Documented occurrence within 1/2 mi. & suitable habita	No documented occurrence in 1/2 mi. but suitable habitat	No occurrence & no suitable habitat	
Average Score - Fish & Aquatic Habitat	**1.7**					

4. SCENIC QUALITY	Score	10	5	1	0	Notes
1. Wetland vegetation classes visible?	10.0	≥ 3 classes	2 classes	1 class		
2. Public access?	5.0	Public access & trails/road	Public access; no trails	No public access		
3. Visible extent across wetland?	10.0	Large expanse	Somewhat restricted view	Forested; no view		
4. Open water visible?	1.0	> 3 acres	1-3 acres	< 1 acre		
5. Visual contrast with landforms?	1.0	High level of contrast	Some visual contrast	Little contrast or developed		
6. Diversity of plants (flowers, fall color…)?	10.0	High level of diversity	Moderate level diversity	Low or no diversity		
7. General appearance of wetland?	7.5	Undisturbed & natural	Minor visual detractors	Severe visual detractors		
Average Score - Scenic Quality	**6.4**					

5. EDUCATIONAL POTENTIAL	Score	10	5	1	0	Notes
1. Ecological Integrity Score?	4.4					
2. Wildlife Habitat Score?	4.4					
3. Public access? (use F4, Q2 score)?	5.0					
4. Adequate parking for 10-15 cars or bus?	5.0	< 5 mins from site	10-15 min walk from site	> 15 mins walk / no parking		
5. Wetland vegetation classes accessible?	5.0	≥ 3 classes	2 classes	1 class		
6. Access to perennial stream / pond?	1.0	Direct water access	Access 5 mins or less	No access and no water		
7. Scenic Quality Score?	6.4					
8. Disabled access		Yes			No	
Average Score - Education	**3.9**					

6. WETLAND RECREATION	Score	10	5	1	0	Notes
1. Wildlife Habitat Score?	4.4					
2. Open water access (canoes & kayaks)?	1.0	Open water & easy access	open water; limited access	No open water or access		
3. Hiking, Fishing, Hunting?	5.0	Maintained trails present	Trails but not maintained	No trails		
4. Off-road parking for two or more cars?	5.0	< 5 mins from site	5-10 min walk from site	> 10 mins walk or no parking		
5. Scenic Quality Score?	6.4					
Average Score - Wetland Recreation	**4.4**					

7. FLOOD WATER STORAGE	Score	10	5	1	0	Notes
Use separate Flood Storage Index worksheet						

Field work is not needed for this function						
Average Score - Flood Storage	**0.0**					

8. GROUNDWATER	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Stratified drift aquifer beneath wetland?	5.0	Wetland overlies aquifer	Wetland adjacent to aquifer	No aquifer beneath or adjacent		
2. Public water supply area?	1.0	Wetland in in Favorable Gravel Well area	Wetland adjacent to Favorable Gravel Well area	No Favorable Gravel Well area		
3. Dominant soil type within 500 ft?	5.0	> 50% of Table 3 soils	25-50% of Table 3 soils	< 25% ofTable 3 soils		
Average Score - Groundwater	**3.7**					

9. SEDIMENT TRAPPING	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0.0					
2. Wetland outlet?		No outlet	Constricted outlet	Outlet not constricted or flow within stream channel		
3. Shape of stream channel in wetland?		No stream	Sinous channel	Stream channel straight		
4. Wetland to watershed size ratio?		Wetland > 20% of watershed	Wetland 5-20% of watershed	Wetland <5% of watershed		
5. Gradient of wetland?		Gradient < 1% and no outlet	Gradient 1-3%	Gradient > 3%		
6. Dominant vegetation class?		Persistent emergent, foreste scrub-shrub, bogs	Nonpersistent emergents	Open water or Aquatic bed		
7. Wetland vegetation density/distribution?		>90% vegetated & no channels	70-90% vegetated & distributed	21 - 50% distributed	0-20% vegetated	
8. Avg. water depth in growing season?		< 1 ft deep or no open water	> 1 ft deep and < 6.6ft	> 6.6ft deep		
Average Score - Sediment Trapping	**0.0**					

10. NUTRIENTS	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0.0					
2. Sediment Trapping Score?	0.0					
3. Dominant vegetation class (use F9, Q8)	0.0					
4. Dominant hydroperiod?		Permanent/semipermanent flooding	Seaonal flooding or Saturate	Saturated / temporarily flooded		
5. Dominant soils in wetland?		Very poorly drained soils and not a peatland	Poorly drained soils with leaf litter or fine sediments	Sand, gravel, boulders, bedrock or peatland		
6. Avg. water depth (use F9, Q8)	0.0					
Average Score - Nutrients	**0.0**					

11. SHORELINE ANCHORING		**10**	**5**	**1**	**0**	**Notes**
1. Gradation of wetland vegetation?		≥ 3 vegetation classes	2 wetland classes	1 wetland class		
2. Vegetation density in wetland?		> 90% cover	70-90% cover	< 70% cover		
3. Width of wetland along water body?		> 20 ft	10-20 ft	< 10 ft		
4. % of wetland edge undisturbed?		> 95%	75-95%	< 75%		

Average Score - Shoreline Anchoring	0.0

12. NOTEWORTHINESS		10	5	1	0	Notes
1. Critical Wildlife Habitat (NH WAP)?		YES			NO	
2. Wetland in/near Highest Ranked Habitat		YES			NO	
(NH WAP)?		YES			NO	
3. Local significance, high scores, Largest		YES			NO	
4. Local or regional significance?		YES			NO	
5. Locally rare/unique biological		YES			NO	
or geological features		YES			NO	
6. Important historic or archaeologic site?		YES			NO	
7. Connected to designated river?		YES			NO	
8. Wetland in urban setting?		YES			NO	
Average Score - Noteworthiness	0.0					

Wetland name/code *ND1* *Coldrain Pond* **Date Evaluated:** *6/17/2010*
Wetland area (acres) *xx* **Evaluated by:** *Amanda Stone*
Watershed area (acres) *xxx*

Do not enter data into cells highlighted in blue. These cells contain formulas that automatically carry data over from function to function, or total and average functional scores.

1. ECOLOGICAL INTEGRITY	Score	10	5	1	0	Notes
1. Water quality (sediment/nutrients)?	10.0	No sources	1-2 sources	> 3 sources		
2. Fill in Wetland?	7.5	Less than 1%	1-3%	3%		
3. Agriculture in wetland?	10.0	Less than 5%	5-25%	> 25%		
4. Logging activity in wetland?	5.0	Less than 1%	1-10%	> 10%		
5. Human activity in wetland?	7.5	Low	Moderate	High		
6. Invasive plants in wetland?	5.0	< 5%	5-30%	>30%		
7. Road/driveway/railroad crossings?	5.0	None	One	Two or more		
8. Human activity in upland?	7.5	Low	Moderate	High		
9. Buildings within 500 ft?	5.0	> 50 acres/bldg	11-50 acres/bldg	< 10 acres/bldg		
10. Water level control structure?	10.0	None	Bridge/culvert >10 ft	Culvert <10'/clogged	No stream	
Average Score - Ecological Integrity	**7.3**					

2. WETLAND WILDLIFE HABITAT	Score	10	5	1	0	Notes
1. Wetland acres?	5.0	> 100 acres	20-100 acres	<20 acres		
2. Ecological Integrity Avg. score?	7.3					
3. Water quality (Use F1, Q1 score)?	10.0					
4. Open water < 6.6ft deep?	5.0	> 3 acres	0.5 - 3 acres	< 0.5 acre		
5. Deepwater Habitats?	0.0	stream ≥ 1 mile or lake/pond ≥10acre	stream < 1 mile or lake/pond <10acre		No deepwater	
6. Wetland vegetation class diversity?	5.0	3 or more classes	2 classes	1 class		
7. Proximity to other wetlands?	5.0	connected/unconnected within 0.25 mile	connected 0.5-1mi. Or unconnected 0.25-0.5 mi.	Not connected or > 0.5 mi. from unconnected		
8. Wildlife travel corridors?	7.5	Free access	Access partially blocked	Access blocked		
9. % of wetland edge undisturbed?	5.0	>95%	75-95%	< 75%		
10. Invasive plants (Use F1, Q6 score)	5.0					
Average Score - Wildlife Habitat	**5.5**					

3. FISH & AQUATIC HABITAT	Score	10	5	1	0	Notes
1. Dominant land use in watershed?	5.0	Woodland, wetland, inactive	Active farm/rural res	Urban & heavily developed		
		farmland				
2. Water Quality? (use F1, Q1 score)	10.0					
3. Open water?(use F2, Q4 score)	5.0					
4. Deepwater habitats > 6.6 ft deep?	0.0	> 100 acres	10-100 acres	< 10 acres	Not present	
5. Stream width in wetland?	0.0	> 50 ft	25-50 ft	< 25 ft	Not present	
6. Alteration of stream channel?	10.0	Natural channel / low gradient or steep gradient w/ riffles	Recently modified or formerly channelized	Recently channelized or stream in non-vegetated chute/pipe	Not present	

7. Diversity of substrate types?	1.0	4 or more substrates	2-3 substrates	1 substrate		
8. Coarse woody material and large rocks?	2.5	> 10% of cover in water	< 10% of cover in water	No visible cover	No open water	
10. Barriers to aquatic life?	1.0	No barriers	Artificial barrier with provision for passage	Barrier with no provision for passage	No open water	
9. Floating & submerged vegetation?	5.0	> 70% cover in water	30-70% cover in water	< 30% cover	No open water	
11. Rare or endangered fish or aquatic life?	1.0	Documented occurrence in or near wetland	Documented occurrence within 1/2 mi. & suitable habita	No documented occurrence in 1/2 mi. but suitable habitat	No occurrence & no suitable habitat	
Average Score - Fish & Aquatic Habitat	**3.7**					

4. SCENIC QUALITY	Score	10	5	1	0	Notes
1. Wetland vegetation classes visible?	10.0	≥ 3 classes	2 classes	1 class		
2. Public access?	10.0	Public access & trails/road	Public access; no trails	No public access		
3. Visible extent across wetland?	10.0	Large expanse	Somewhat restricted view	Forested; no view		
4. Open water visible?	5.0	> 3 acres	1-3 acres	< 1 acre		
5. Visual contrast with landforms?	5.0	High level of contrast	Some visual contrast	Little contrast or developed		
6. Diversity of plants (flowers, fall color…)?	1.0	High level of diversity	Moderate level diversity	Low or no diversity		
7. General appearance of wetland?	7.5	Undisturbed & natural	Minor visual detractors	Severe visual detractors		
Average Score - Scenic Quality	**6.9**					

5. EDUCATIONAL POTENTIAL	Score	10	5	1	0	Notes
1. Ecological Integrity Score?	5.5					
2. Wildlife Habitat Score?	5.5					
3. Public access? (use F4, Q2 score)?	10.0					
4. Adequate parking for 10-15 cars or bus?	5.0	< 5 mins from site	10-15 min walk from site	> 15 mins walk / no parking		
5. Wetland vegetation classes accessible?	1.0	≥ 3 classes	2 classes	1 class		
6. Access to perennial stream / pond?	1.0	Direct water access	Access 5 mins or less	No access/water		
7. Scenic Quality Score?	6.9					
8. Disabled access		Yes			No	
Average Score - Education	**4.4**					

6. WETLAND RECREATION	Score	10	5	1	0	Notes
1. Wildlife Habitat Score?	5.5					
2. Open water access (canoes & kayaks)?	5.0	Open water & easy access	open water; limited access	No open water or access		
3. Hiking, Fishing, Hunting?	5.0	Maintained trails present	Trails but not maintained	No trails		
4. Off-road parking for two or more cars?	5.0	< 5 mins from site	5-10 min walk from site	> 10 mins walk or no parking		
5. Scenic Quality Score?	6.9					
Average Score - Wetland Recreation	**5.5**					

7. FLOOD WATER STORAGE	Score	10	5	1	0	Notes
Use separate Flood Storage Index worksheet						

Field work is not needed for this function						
Average Score - Flood Storage	**0.0**					

8. GROUNDWATER	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Stratified drift aquifer beneath wetland?	10.0	Wetland overlies aquifer	Wetland adjacent to aquifer	No aquifer beneath or adjacent		
2. Public water supply area?	5.0	Wetland in in Favorable Gravel Well area	Wetland adjacent to Favorable Gravel Well area	No Favorable Gravel Well area		
3. Dominant soil type within 500 ft?	5.0	> 50% of Table 3 soils	25-50% of Table 3 soils	< 25% ofTable 3 soils		
Average Score - Groundwater	**6.7**					

9. SEDIMENT TRAPPING	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0.0					
2. Wetland outlet?		No outlet	Constricted outlet	Outlet not constricted or flow within stream channel		
3. Shape of stream channel in wetland?		No stream	Sinous channel	Stream channel straight		
4. Wetland to watershed size ratio?		Wetland > 20% of watershed	Wetland 5-20% of watershed	Wetland <5% of watershed		
5. Gradient of wetland?		Gradient < 1% and no outlet	Gradient 1-3%	Gradient > 3%		
6. Dominant vegetation class?		Persistent emergent, foreste scrub-shrub, bogs	Nonpersistent emergents	Open water or Aquatic bed		
7. Wetland vegetation density/distribution?		>90% vegetated & no channels	70-90% vegetated & distributed	21 - 50% distributed	0-20% vegetated	
8. Avg. water depth in growing season?		< 1 ft deep or no open water	> 1 ft deep and < 6.6ft	> 6.6ft deep		
Average Score - Sediment Trapping	**0.0**					

10. NUTRIENTS	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0.0					
2. Sediment Trapping Score?	0.0					
3. Dominant vegetation class (use F9, Q8)	0.0					
4. Dominant hydroperiod?	10.0	Permanent/semipermanent flooding	Seaonal flooding or Saturate	Saturated / temporarily flooded		
5. Dominant soils in wetland?	10.0	Very poorly drained soils and not a peatland	Poorly drained soils with leaf litter or fine sediments	Sand, gravel, boulders, bedrock or peatland		
6. Avg. water depth (use F9, Q8)	0.0					
Average Score - Nutrients	**3.3**					

11. SHORELINE ANCHORING		**10**	**5**	**1**	**0**	**Notes**
1. Gradation of wetland vegetation?	5.0	≥ 3 vegetation classes	2 wetland classes	1 wetland class		
2. Vegetation density in wetland?	10.0	> 90% cover	70-90% cover	< 70% cover		
3. Width of wetland along water body?	10.0	> 20 ft	10-20 ft	< 10 ft		
4. % of wetland edge undisturbed?	5.0	> 95%	75-95%	< 75%		

Average Score - Shoreline Anchoring	7.5

12. NOTEWORTHINESS		10	5	1	0	Notes
1. Critical Wildlife Habitat (NH WAP)?		YES			NO	
2. Wetland in/near Highest Ranked Habitat		YES			NO	
(NH WAP)?		YES			NO	
3. Local significance, high scores, Largest		YES			NO	
4. Local or regional significance?		YES			NO	
5. Locally rare/unique biological		YES			NO	
or geological features		YES			NO	
6. Important historic or archaeologic site?		YES			NO	
7. Connected to designated river?	10.0	YES			NO	
8. Wetland in urban setting?		YES			NO	
Average Score - Noteworthiness	10.0					

Wetland name/code *ND1* *Coldrain Pond* **Date Evaluated:** *6/17/2010*
Wetland area (acres) *xx* **Evaluated by:** *Amanda Stone*
Watershed area (acres) *xxx*

Do not enter data into cells highlighted in blue. These cells contain formulas that automatically carry data over from function to function, or total and average functional scores.

1. ECOLOGICAL INTEGRITY	Score	10	5	1	0	Notes
1. Water quality (sediment/nutrients)?		No sources	1-2 sources	> 3 sources		
2. Fill in Wetland?		Less than 1%	1-3%	3%		
3. Agriculture in wetland?		Less than 5%	5-25%	> 25%		
4. Logging activity in wetland?		Less than 1%	1-10%	> 10%		
5. Human activity in wetland?		Low	Moderate	High		
6. Invasive plants in wetland?		< 5%	5-30%	>30%		
7. Road/driveway/railroad crossings?		None	One	Two or more		
8. Human activity in upland?		Low	Moderate	High		
9. Buildings within 500 ft?		> 50 acres/bldg	11-50 acres/bldg	< 10 acres/bldg		
10. Water level control structure?		None	Bridge/culvert >10 ft	Culvert <10'/clogged	No stream	
Average Score - Ecological Integrity	**0**					

2. WETLAND WILDLIFE HABITAT	Score	10	5	1	0	Notes
1. Wetland acres?		> 100 acres	20-100 acres	<20 acres		
2. Ecological Integrity Avg. score?	0					
3. Water quality (Use F1, Q1 score)?	0					
4. Open water < 6.6ft deep?		> 3 acres	0.5 - 3 acres	< 0.5 acre		
5. Deepwater Habitats?		stream ≥ 1 mile or lake/pond ≥10acre	stream < 1 mile or lake/pond <10acre		No deepwater	
6. Wetland vegetation class diversity?		3 or more classes	2 classes	1 class		
7. Proximity to other wetlands?		connected/unconnected within 0.25 mile	connected 0.5-1mi. Or unconnected 0.25-0.5 mi.	Not connected or > 0.5 mi. from unconnected		
8. Wildlife travel corridors?		Free access	Access partially blocked	Access blocked		
9. % of wetland edge undisturbed?		>95%	75-95%	< 75%		
10. Invasive plants (Use F1, Q6 score)	0					
Average Score - Wildlife Habitat	**0**					

3. FISH & AQUATIC HABITAT	Score	10	5	1	0	Notes
1. Dominant land use in watershed?		Woodland, wetland, inactive	Active farm/rural res	Urban & heavily developed		
		farmland				
2. Water Quality? (use F1, Q1 score)	0					
3. Open water?(use F2, Q4 score)	0					
4. Deepwater habitats > 6.6 ft deep?		> 100 acres	10-100 acres	< 10 acres	Not present	
5. Stream width in wetland?		> 50 ft	25-50 ft	< 25 ft	Not present	
6. Alteration of stream channel?		Natural channel / low gradient or steep gradient w/ riffles	Recently modified or formerly channelized	Recently channelized or stream in non-vegetated chute/pipe	Not present	

7. Diversity of substrate types?		4 or more substrates	2-3 substrates	1 substrate		
8. Coarse woody material and large rocks?		> 10% of cover in water	< 10% of cover in water	No visible cover	No open water	
10. Barriers to aquatic life?		No barriers	Artificial barrier with provision for passage	Barrier with no provision for passage	No open water	
9. Floating & submerged vegetation?		> 70% cover in water	30-70% cover in water	< 30% cover	No open water	
11. Rare or endangered fish or aquatic life?		Documented occurrence in or near wetland	Documented occurrence within 1/2 mi. & suitable habita	No documented occurrence in 1/2 mi. but suitable habitat	No occurrence & no suitable habitat	
Average Score - Fish & Aquatic Habitat	**0**					

4. SCENIC QUALITY	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wetland vegetation classes visible?		≥ 3 classes	2 classes	1 class		
2. Public access?		Public access & trails/road	Public access; no trails	No public access		
3. Visible extent across wetland?		Large expanse	Somewhat restricted view	Forested; no view		
4. Open water visible?		> 3 acres	1-3 acres	< 1 acre		
5. Visual contrast with landforms?		High level of contrast	Some visual contrast	Little contrast or developed		
6. Diversity of plants (flowers, fall color…)?		High level of diversity	Moderate level diversity	Low or no diversity		
7. General appearance of wetland?		Undisturbed & natural	Minor visual detractors	Severe visual detractors		
Average Score - Scenic Quality	**0**					

5. EDUCATIONAL POTENTIAL	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Ecological Integrity Score?	0					
2. Wildlife Habitat Score?	0					
3. Public access? (use F4, Q2 score)?	0					
4. Adequate parking for 10-15 cars or bus?		< 5 mins from site	10-15 min walk from site	> 15 mins walk / no parking		
5. Wetland vegetation classes accessible?		≥ 3 classes	2 classes	1 class		
6. Access to perennial stream / pond?		Direct water access	Access 5 mins or less	No access or no water		
7. Scenic Quality Score?	0					
8. Disabled access		Yes			No	
Average Score - Education	**0**					

6. WETLAND RECREATION	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wildlife Habitat Score?	0					
2. Open water access (canoes & kayaks)?		Open water & easy access	open water; limited access	No open water or access		
3. Hiking, Fishing, Hunting?		Maintained trails present	Trails but not maintained	No trails		
4. Off-road parking for two or more cars?		< 5 mins from site	5-10 min walk from site	> 10 mins walk or no parking		
5. Scenic Quality Score?	0					
Average Score - Wetland Recreation	**0**					

7. FLOOD WATER STORAGE	**Score**	**10**	**5**	**1**	**0**	**Notes**
Use separate Flood Storage Index worksheet						

Field work is not needed for this function						
Average Score - Flood Storage	**0**					

8. GROUNDWATER	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Stratified drift aquifer beneath wetland?		Wetland overlies aquifer	Wetland adjacent to aquifer	No aquifer beneath or adjacent		
2. Public water supply area?		Wetland in in Favorable Gravel Well area	Wetland adjacent to Favorable Gravel Well area	No Favorable Gravel Well area		
3. Dominant soil type within 500 ft?		> 50% of Table 3 soils	25-50% of Table 3 soils	< 25% ofTable 3 soils		
Average Score - Groundwater	**0**					

9. SEDIMENT TRAPPING	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0.0					
2. Wetland outlet?		No outlet	Constricted outlet	Outlet not constricted or flow within stream channel		
3. Shape of stream channel in wetland?		No stream	Sinous channel	Stream channel straight		
4. Wetland to watershed size ratio?		Wetland > 20% of watershed	Wetland 5-20% of watershed	Wetland <5% of watershed		
5. Gradient of wetland?		Gradient < 1% and no outlet	Gradient 1-3%	Gradient > 3%		
6. Dominant vegetation class?		Persistent emergent, foreste scrub-shrub, bogs	Nonpersistent emergents	Open water or Aquatic bed		
7. Wetland vegetation density/distribution?		>90% vegetated & no channels	70-90% vegetated & distributed	21 - 50% distributed	0-20% vegetated	
8. Avg. water depth in growing season?		< 1 ft deep or no open water	> 1 ft deep and < 6.6ft	> 6.6ft deep		
Average Score - Sediment Trapping	**0.0**					

10. NUTRIENTS	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0					
2. Sediment Trapping Score?	0.0					
3. Dominant vegetation class (use F9, Q8)	0					
4. Dominant hydroperiod?		Permanent/semipermanent flooding	Seaonal flooding or Saturate	Saturated / temporarily flooded		
5. Dominant soils in wetland?		Very poorly drained soils and not a peatland	Poorly drained soils with leaf litter or fine sediments	Sand, gravel, boulders, bedrock or peatland		
6. Avg. water depth (use F9, Q8)	0.0					
Average Score - Nutrients	**0**					

11. SHORELINE ANCHORING		**10**	**5**	**1**	**0**	**Notes**
1. Gradation of wetland vegetation?		≥ 3 vegetation classes	2 wetland classes	1 wetland class		
2. Vegetation density in wetland?		> 90% cover	70-90% cover	< 70% cover		
3. Width of wetland along water body?		> 20 ft	10-20 ft	< 10 ft		
4. % of wetland edge undisturbed?		> 95%	75-95%	< 75%		

Average Score - Shoreline Anchoring	0

12. NOTEWORTHINESS		10	5	1	0	Notes
1. Critical Wildlife Habitat (NH WAP)?		YES			NO	
2. Wetland in/near Highest Ranked Habitat		YES			NO	
(NH WAP)?		YES			NO	
3. Local significance, high scores, Largest		YES			NO	
4. Local or regional significance?		YES			NO	
5. Locally rare/unique biological		YES			NO	
or geological features		YES			NO	
6. Important historic or archaeologic site?		YES			NO	
7. Connected to designated river?		YES			NO	
8. Wetland in urban setting?		YES			NO	
Average Score - Noteworthiness	0					

Wetland name/code *ND1* *Coldrain Pond* **Date Evaluated:** *6/17/2010*
Wetland area (acres) *xx* **Evaluated by:** *Amanda Stone*
Watershed area (acres) *xxx*

Do not enter data into cells highlighted in blue. These cells contain formulas that automatically carry data over from function to function, or total and average functional scores.

1. ECOLOGICAL INTEGRITY	Score	10	5	1	0	Notes
1. Water quality (sediment/nutrients)?		No sources	1-2 sources	> 3 sources		
2. Fill in Wetland?		Less than 1%	1-3%	3%		
3. Agriculture in wetland?		Less than 5%	5-25%	> 25%		
4. Logging activity in wetland?		Less than 1%	1-10%	> 10%		
5. Human activity in wetland?		Low	Moderate	High		
6. Invasive plants in wetland?		< 5%	5-30%	>30%		
7. Road/driveway/railroad crossings?		None	One	Two or more		
8. Human activity in upland?		Low	Moderate	High		
9. Buildings within 500 ft?		> 50 acres/bldg	11-50 acres/bldg	< 10 acres/bldg		
10. Water level control structure?		None	Bridge/culvert >10 ft	Culvert <10'/clogged	No stream	
Average Score - Ecological Integrity	**0**					

2. WETLAND WILDLIFE HABITAT	Score	10	5	1	0	Notes
1. Wetland acres?		> 100 acres	20-100 acres	<20 acres		
2. Ecological Integrity Avg. score?	0					
3. Water quality (Use F1, Q1 score)?	0					
4. Open water < 6.6ft deep?		> 3 acres	0.5 - 3 acres	< 0.5 acre		
5. Deepwater Habitats?		stream ≥ 1 mile or lake/pond ≥10acre	stream < 1 mile or lake/pond <10acre		No deepwater	
6. Wetland vegetation class diversity?		3 or more classes	2 classes	1 class		
7. Proximity to other wetlands?		connected/unconnected within 0.25 mile	connected 0.5-1mi. Or unconnected 0.25-0.5 mi.	Not connected or > 0.5 mi. from unconnected		
8. Wildlife travel corridors?		Free access	Access partially blocked	Access blocked		
9. % of wetland edge undisturbed?		>95%	75-95%	< 75%		
10. Invasive plants (Use F1, Q6 score)	0					
Average Score - Wildlife Habitat	**0**					

3. FISH & AQUATIC HABITAT	Score	10	5	1	0	Notes
1. Dominant land use in watershed?		Woodland, wetland, inactive	Active farm/rural res	Urban & heavily developed		
		farmland				
2. Water Quality? (use F1, Q1 score)	0					
3. Open water?(use F2, Q4 score)	0					
4. Deepwater habitats > 6.6 ft deep?		> 100 acres	10-100 acres	< 10 acres	Not present	
5. Stream width in wetland?		> 50 ft	25-50 ft	< 25 ft	Not present	
6. Alteration of stream channel?		Natural channel / low gradient or steep gradient w/ riffles	Recently modified or formerly channelized	Recently channelized or stream in non-vegetated chute/pipe	Not present	

7. Diversity of substrate types?		4 or more substrates	2-3 substrates	1 substrate		
8. Coarse woody material and large rocks?		> 10% of cover in water	< 10% of cover in water	No visible cover	No open water	
10. Barriers to aquatic life?		No barriers	Artificial barrier with provision for passage	Barrier with no provision for passage	No open water	
9. Floating & submerged vegetation?		> 70% cover in water	30-70% cover in water	< 30% cover	No open water	
11. Rare or endangered fish or aquatic life?		Documented occurrence in or near wetland	Documented occurrence within 1/2 mi. & suitable habita	No documented occurrence in 1/2 mi. but suitable habitat	No occurrence & no suitable habitat	
Average Score - Fish & Aquatic Habitat	**0**					

4. SCENIC QUALITY	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wetland vegetation classes visible?		≥ 3 classes	2 classes	1 class		
2. Public access?		Public access & trails/road	Public access; no trails	No public access		
3. Visible extent across wetland?		Large expanse	Somewhat restricted view	Forested; no view		
4. Open water visible?		> 3 acres	1-3 acres	< 1 acre		
5. Visual contrast with landforms?		High level of contrast	Some visual contrast	Little contrast or developed		
6. Diversity of plants (flowers, fall color…)?		High level of diversity	Moderate level diversity	Low or no diversity		
7. General appearance of wetland?		Undisturbed & natural	Minor visual detractors	Severe visual detractors		
Average Score - Scenic Quality	**0**					

5. EDUCATIONAL POTENTIAL	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Ecological Integrity Score?	0					
2. Wildlife Habitat Score?	0					
3. Public access? (use F4, Q2 score)?	0					
4. Adequate parking for 10-15 cars or bus?		< 5 mins from site	10-15 min walk from site	> 15 mins walk / no parking		
5. Wetland vegetation classes accessible?		≥ 3 classes	2 classes	1 class		
6. Access to perennial stream / pond?		Direct water access	Access 5 mins or less	No access or no water		
7. Scenic Quality Score?	0					
8. Disabled access		Yes			No	
Average Score - Education	**0**					

6. WETLAND RECREATION	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wildlife Habitat Score?	0					
2. Open water access (canoes & kayaks)?		Open water & easy access	open water; limited access	No open water or access		
3. Hiking, Fishing, Hunting?		Maintained trails present	Trails but not maintained	No trails		
4. Off-road parking for two or more cars?		< 5 mins from site	5-10 min walk from site	> 10 mins walk or no parking		
5. Scenic Quality Score?	0					
Average Score - Wetland Recreation	**0**					

7. FLOOD WATER STORAGE	**Score**	**10**	**5**	**1**	**0**	**Notes**
Use separate Flood Storage Index worksheet						

Field work is not needed for this function						
Average Score - Flood Storage	**0**					

8. GROUNDWATER	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Stratified drift aquifer beneath wetland?		Wetland overlies aquifer	Wetland adjacent to aquifer	No aquifer beneath or adjacent		
2. Public water supply area?		Wetland in in Favorable Gravel Well area	Wetland adjacent to Favorable Gravel Well area	No Favorable Gravel Well area		
3. Dominant soil type within 500 ft?		> 50% of Table 3 soils	25-50% of Table 3 soils	< 25% ofTable 3 soils		
Average Score - Groundwater	**0**					

9. SEDIMENT TRAPPING	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0.0					
2. Wetland outlet?		No outlet	Constricted outlet	Outlet not constricted or flow within stream channel		
3. Shape of stream channel in wetland?		No stream	Sinous channel	Stream channel straight		
4. Wetland to watershed size ratio?		Wetland > 20% of watershed	Wetland 5-20% of watershed	Wetland <5% of watershed		
5. Gradient of wetland?		Gradient < 1% and no outlet	Gradient 1-3%	Gradient > 3%		
6. Dominant vegetation class?		Persistent emergent, foreste scrub-shrub, bogs	Nonpersistent emergents	Open water or Aquatic bed		
7. Wetland vegetation density/distribution?		>90% vegetated & no channels	70-90% vegetated & distributed	21 - 50% distributed	0-20% vegetated	
8. Avg. water depth in growing season?		< 1 ft deep or no open water	> 1 ft deep and < 6.6ft	> 6.6ft deep		
Average Score - Sediment Trapping	**0.0**					

10. NUTRIENTS	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0					
2. Sediment Trapping Score?	0.0					
3. Dominant vegetation class (use F9, Q8)	0					
4. Dominant hydroperiod?		Permanent/semipermanent flooding	Seaonal flooding or Saturate	Saturated / temporarily flooded		
5. Dominant soils in wetland?		Very poorly drained soils and not a peatland	Poorly drained soils with leaf litter or fine sediments	Sand, gravel, boulders, bedrock or peatland		
6. Avg. water depth (use F9, Q8)	0.0					
Average Score - Nutrients	**0**					

11. SHORELINE ANCHORING		**10**	**5**	**1**	**0**	**Notes**
1. Gradation of wetland vegetation?		≥ 3 vegetation classes	2 wetland classes	1 wetland class		
2. Vegetation density in wetland?		> 90% cover	70-90% cover	< 70% cover		
3. Width of wetland along water body?		> 20 ft	10-20 ft	< 10 ft		
4. % of wetland edge undisturbed?		> 95%	75-95%	< 75%		

Average Score - Shoreline Anchoring	0

12. NOTEWORTHINESS		10	5	1	0	Notes
1. Critical Wildlife Habitat (NH WAP)?		YES			NO	
2. Wetland in/near Highest Ranked Habitat		YES			NO	
(NH WAP)?		YES			NO	
3. Local significance, high scores, Largest		YES			NO	
4. Local or regional significance?		YES			NO	
5. Locally rare/unique biological		YES			NO	
or geological features		YES			NO	
6. Important historic or archaeologic site?		YES			NO	
7. Connected to designated river?		YES			NO	
8. Wetland in urban setting?		YES			NO	
Average Score - Noteworthiness	0					

Wetland name/code *ND1* *Coldrain Pond* **Date Evaluated:** *6/17/2010*
Wetland area (acres) *xx* **Evaluated by:** *Amanda Stone*
Watershed area (acres) *xxx*

Do not enter data into cells highlighted in blue. These cells contain formulas that automatically carry data over from function to function, or total and average functional scores.

1. ECOLOGICAL INTEGRITY	Score	10	5	1	0	Notes
1. Water quality (sediment/nutrients)?		No sources	1-2 sources	> 3 sources		
2. Fill in Wetland?		Less than 1%	1-3%	3%		
3. Agriculture in wetland?		Less than 5%	5-25%	> 25%		
4. Logging activity in wetland?		Less than 1%	1-10%	> 10%		
5. Human activity in wetland?		Low	Moderate	High		
6. Invasive plants in wetland?		< 5%	5-30%	>30%		
7. Road/driveway/railroad crossings?		None	One	Two or more		
8. Human activity in upland?		Low	Moderate	High		
9. Buildings within 500 ft?		> 50 acres/bldg	11-50 acres/bldg	< 10 acres/bldg		
10. Water level control structure?		None	Bridge/culvert >10 ft	Culvert <10'/clogged	No stream	
Average Score - Ecological Integrity	**0**					

2. WETLAND WILDLIFE HABITAT	Score	10	5	1	0	Notes
1. Wetland acres?		> 100 acres	20-100 acres	<20 acres		
2. Ecological Integrity Avg. score?	0					
3. Water quality (Use F1, Q1 score)?	0					
4. Open water < 6.6ft deep?		> 3 acres	0.5 - 3 acres	< 0.5 acre		
5. Deepwater Habitats?		stream ≥ 1 mile or lake/pond ≥10acre	stream < 1 mile or lake/pond <10acre		No deepwater	
6. Wetland vegetation class diversity?		3 or more classes	2 classes	1 class		
7. Proximity to other wetlands?		connected/unconnected within 0.25 mile	connected 0.5-1mi. Or unconnected 0.25-0.5 mi.	Not connected or > 0.5 mi. from unconnected		
8. Wildlife travel corridors?		Free access	Access partially blocked	Access blocked		
9. % of wetland edge undisturbed?		>95%	75-95%	< 75%		
10. Invasive plants (Use F1, Q6 score)	0					
Average Score - Wildlife Habitat	**0**					

3. FISH & AQUATIC HABITAT	Score	10	5	1	0	Notes
1. Dominant land use in watershed?		Woodland, wetland, inactive	Active farm/rural res	Urban & heavily developed		
		farmland				
2. Water Quality? (use F1, Q1 score)	0					
3. Open water?(use F2, Q4 score)	0					
4. Deepwater habitats > 6.6 ft deep?		> 100 acres	10-100 acres	< 10 acres	Not present	
5. Stream width in wetland?		> 50 ft	25-50 ft	< 25 ft	Not present	
6. Alteration of stream channel?		Natural channel / low gradient or steep gradient w/ riffles	Recently modified or formerly channelized	Recently channelized or stream in non-vegetated chute/pipe	Not present	

7. Diversity of substrate types?		4 or more substrates	2-3 substrates	1 substrate		
8. Coarse woody material and large rocks?		> 10% of cover in water	< 10% of cover in water	No visible cover	No open water	
10. Barriers to aquatic life?		No barriers	Artificial barrier with provision for passage	Barrier with no provision for passage	No open water	
9. Floating & submerged vegetation?		> 70% cover in water	30-70% cover in water	< 30% cover	No open water	
11. Rare or endangered fish or aquatic life?		Documented occurrence in or near wetland	Documented occurrence within 1/2 mi. & suitable habita	No documented occurrence in 1/2 mi. but suitable habitat	No occurrence & no suitable habitat	
Average Score - Fish & Aquatic Habitat	**0**					

4. SCENIC QUALITY	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wetland vegetation classes visible?		≥ 3 classes	2 classes	1 class		
2. Public access?		Public access & trails/road	Public access; no trails	No public access		
3. Visible extent across wetland?		Large expanse	Somewhat restricted view	Forested; no view		
4. Open water visible?		> 3 acres	1-3 acres	< 1 acre		
5. Visual contrast with landforms?		High level of contrast	Some visual contrast	Little contrast or developed		
6. Diversity of plants (flowers, fall color…)?		High level of diversity	Moderate level diversity	Low or no diversity		
7. General appearance of wetland?		Undisturbed & natural	Minor visual detractors	Severe visual detractors		
Average Score - Scenic Quality	**0**					

5. EDUCATIONAL POTENTIAL	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Ecological Integrity Score?	0					
2. Wildlife Habitat Score?	0					
3. Public access? (use F4, Q2 score)?	0					
4. Adequate parking for 10-15 cars or bus?		< 5 mins from site	10-15 min walk from site	> 15 mins walk / no parking		
5. Wetland vegetation classes accessible?		≥ 3 classes	2 classes	1 class		
6. Access to perennial stream / pond?		Direct water access	Access 5 mins or less	No access or no water		
7. Scenic Quality Score?	0					
8. Disabled access		Yes			No	
Average Score - Education	**0**					

6. WETLAND RECREATION	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wildlife Habitat Score?	0					
2. Open water access (canoes & kayaks)?		Open water & easy access	open water; limited access	No open water or access		
3. Hiking, Fishing, Hunting?		Maintained trails present	Trails but not maintained	No trails		
4. Off-road parking for two or more cars?		< 5 mins from site	5-10 min walk from site	> 10 mins walk or no parking		
5. Scenic Quality Score?	0					
Average Score - Wetland Recreation	**0**					

7. FLOOD WATER STORAGE	**Score**	**10**	**5**	**1**	**0**	**Notes**
Use separate Flood Storage Index worksheet						

Field work is not needed for this function						
Average Score - Flood Storage	**0**					

8. GROUNDWATER	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Stratified drift aquifer beneath wetland?		Wetland overlies aquifer	Wetland adjacent to aquifer	No aquifer beneath or adjacent		
2. Public water supply area?		Wetland in in Favorable Gravel Well area	Wetland adjacent to Favorable Gravel Well area	No Favorable Gravel Well area		
3. Dominant soil type within 500 ft?		> 50% of Table 3 soils	25-50% of Table 3 soils	< 25% ofTable 3 soils		
Average Score - Groundwater	**0**					

9. SEDIMENT TRAPPING	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0.0					
2. Wetland outlet?		No outlet	Constricted outlet	Outlet not constricted or flow within stream channel		
3. Shape of stream channel in wetland?		No stream	Sinous channel	Stream channel straight		
4. Wetland to watershed size ratio?		Wetland > 20% of watershed	Wetland 5-20% of watershed	Wetland <5% of watershed		
5. Gradient of wetland?		Gradient < 1% and no outlet	Gradient 1-3%	Gradient > 3%		
6. Dominant vegetation class?		Persistent emergent, foreste scrub-shrub, bogs	Nonpersistent emergents	Open water or Aquatic bed		
7. Wetland vegetation density/distribution?		>90% vegetated & no channels	70-90% vegetated & distributed	21 - 50% distributed	0-20% vegetated	
8. Avg. water depth in growing season?		< 1 ft deep or no open water	> 1 ft deep and < 6.6ft	> 6.6ft deep		
Average Score - Sediment Trapping	**0.0**					

10. NUTRIENTS	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0					
2. Sediment Trapping Score?	0.0					
3. Dominant vegetation class (use F9, Q8)	0					
4. Dominant hydroperiod?		Permanent/semipermanent flooding	Seaonal flooding or Saturate	Saturated / temporarily flooded		
5. Dominant soils in wetland?		Very poorly drained soils and not a peatland	Poorly drained soils with leaf litter or fine sediments	Sand, gravel, boulders, bedrock or peatland		
6. Avg. water depth (use F9, Q8)	0.0					
Average Score - Nutrients	**0**					

11. SHORELINE ANCHORING		**10**	**5**	**1**	**0**	**Notes**
1. Gradation of wetland vegetation?		≥ 3 vegetation classes	2 wetland classes	1 wetland class		
2. Vegetation density in wetland?		> 90% cover	70-90% cover	< 70% cover		
3. Width of wetland along water body?		> 20 ft	10-20 ft	< 10 ft		
4. % of wetland edge undisturbed?		> 95%	75-95%	< 75%		

Average Score - Shoreline Anchoring	0

12. NOTEWORTHINESS		10	5	1	0	Notes
1. Critical Wildlife Habitat (NH WAP)?		YES			NO	
2. Wetland in/near Highest Ranked Habitat		YES			NO	
(NH WAP)?		YES			NO	
3. Local significance, high scores, Largest		YES			NO	
4. Local or regional significance?		YES			NO	
5. Locally rare/unique biological		YES			NO	
or geological features		YES			NO	
6. Important historic or archaeologic site?		YES			NO	
7. Connected to designated river?		YES			NO	
8. Wetland in urban setting?		YES			NO	
Average Score - Noteworthiness	0					

Wetland name/code *ND1* *Coldrain Pond* **Date Evaluated:** *6/17/2010*
Wetland area (acres) *xx* **Evaluated by:** *Amanda Stone*
Watershed area (acres) *xxx*

Do not enter data into cells highlighted in blue. These cells contain formulas that automatically carry data over from function to function, or total and average functional scores.

1. ECOLOGICAL INTEGRITY	Score	10	5	1	0	Notes
1. Water quality (sediment/nutrients)?		No sources	1-2 sources	> 3 sources		
2. Fill in Wetland?		Less than 1%	1-3%	3%		
3. Agriculture in wetland?		Less than 5%	5-25%	> 25%		
4. Logging activity in wetland?		Less than 1%	1-10%	> 10%		
5. Human activity in wetland?		Low	Moderate	High		
6. Invasive plants in wetland?		< 5%	5-30%	>30%		
7. Road/driveway/railroad crossings?		None	One	Two or more		
8. Human activity in upland?		Low	Moderate	High		
9. Buildings within 500 ft?		> 50 acres/bldg	11-50 acres/bldg	< 10 acres/bldg		
10. Water level control structure?		None	Bridge/culvert >10 ft	Culvert <10'/clogged	No stream	
Average Score - Ecological Integrity	**0**					

2. WETLAND WILDLIFE HABITAT	Score	10	5	1	0	Notes
1. Wetland acres?		> 100 acres	20-100 acres	<20 acres		
2. Ecological Integrity Avg. score?	0					
3. Water quality (Use F1, Q1 score)?	0					
4. Open water < 6.6ft deep?		> 3 acres	0.5 - 3 acres	< 0.5 acre		
5. Deepwater Habitats?		stream ≥ 1 mile or lake/pond ≥10acre	stream < 1 mile or lake/pond <10acre		No deepwater	
6. Wetland vegetation class diversity?		3 or more classes	2 classes	1 class		
7. Proximity to other wetlands?		connected/unconnected within 0.25 mile	connected 0.5-1mi. Or unconnected 0.25-0.5 mi.	Not connected or > 0.5 mi. from unconnected		
8. Wildlife travel corridors?		Free access	Access partially blocked	Access blocked		
9. % of wetland edge undisturbed?		>95%	75-95%	< 75%		
10. Invasive plants (Use F1, Q6 score)	0					
Average Score - Wildlife Habitat	**0**					

3. FISH & AQUATIC HABITAT	Score	10	5	1	0	Notes
1. Dominant land use in watershed?		Woodland, wetland, inactive	Active farm/rural res	Urban & heavily developed		
		farmland				
2. Water Quality? (use F1, Q1 score)	0					
3. Open water?(use F2, Q4 score)	0					
4. Deepwater habitats > 6.6 ft deep?		> 100 acres	10-100 acres	< 10 acres	Not present	
5. Stream width in wetland?		> 50 ft	25-50 ft	< 25 ft	Not present	
6. Alteration of stream channel?		Natural channel / low gradient or steep gradient w/ riffles	Recently modified or formerly channelized	Recently channelized or stream in non-vegetated chute/pipe	Not present	

7. Diversity of substrate types?		4 or more substrates	2-3 substrates	1 substrate		
8. Coarse woody material and large rocks?		> 10% of cover in water	< 10% of cover in water	No visible cover	No open water	
10. Barriers to aquatic life?		No barriers	Artificial barrier with provision for passage	Barrier with no provision for passage	No open water	
9. Floating & submerged vegetation?		> 70% cover in water	30-70% cover in water	< 30% cover	No open water	
11. Rare or endangered fish or aquatic life?		Documented occurrence in or near wetland	Documented occurrence within 1/2 mi. & suitable habita	No documented occurrence in 1/2 mi. but suitable habitat	No occurrence & no suitable habitat	
Average Score - Fish & Aquatic Habitat	**0**					

4. SCENIC QUALITY	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wetland vegetation classes visible?		≥ 3 classes	2 classes	1 class		
2. Public access?		Public access & trails/road	Public access; no trails	No public access		
3. Visible extent across wetland?		Large expanse	Somewhat restricted view	Forested; no view		
4. Open water visible?		> 3 acres	1-3 acres	< 1 acre		
5. Visual contrast with landforms?		High level of contrast	Some visual contrast	Little contrast or developed		
6. Diversity of plants (flowers, fall color…)?		High level of diversity	Moderate level diversity	Low or no diversity		
7. General appearance of wetland?		Undisturbed & natural	Minor visual detractors	Severe visual detractors		
Average Score - Scenic Quality	**0**					

5. EDUCATIONAL POTENTIAL	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Ecological Integrity Score?	0					
2. Wildlife Habitat Score?	0					
3. Public access? (use F4, Q2 score)?	0					
4. Adequate parking for 10-15 cars or bus?		< 5 mins from site	10-15 min walk from site	> 15 mins walk / no parking		
5. Wetland vegetation classes accessible?		≥ 3 classes	2 classes	1 class		
6. Access to perennial stream / pond?		Direct water access	Access 5 mins or less	No access or no water		
7. Scenic Quality Score?	0					
8. Disabled access		Yes			No	
Average Score - Education	**0**					

6. WETLAND RECREATION	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wildlife Habitat Score?	0					
2. Open water access (canoes & kayaks)?		Open water & easy access	open water; limited access	No open water or access		
3. Hiking, Fishing, Hunting?		Maintained trails present	Trails but not maintained	No trails		
4. Off-road parking for two or more cars?		< 5 mins from site	5-10 min walk from site	> 10 mins walk or no parking		
5. Scenic Quality Score?	0					
Average Score - Wetland Recreation	**0**					

7. FLOOD WATER STORAGE	**Score**	**10**	**5**	**1**	**0**	**Notes**
Use separate Flood Storage Index worksheet						

Field work is not needed for this function						
Average Score - Flood Storage	**0**					

8. GROUNDWATER	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Stratified drift aquifer beneath wetland?		Wetland overlies aquifer	Wetland adjacent to aquifer	No aquifer beneath or adjacent		
2. Public water supply area?		Wetland in in Favorable Gravel Well area	Wetland adjacent to Favorable Gravel Well area	No Favorable Gravel Well area		
3. Dominant soil type within 500 ft?		> 50% of Table 3 soils	25-50% of Table 3 soils	< 25% ofTable 3 soils		
Average Score - Groundwater	**0**					

9. SEDIMENT TRAPPING	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0.0					
2. Wetland outlet?		No outlet	Constricted outlet	Outlet not constricted or flow within stream channel		
3. Shape of stream channel in wetland?		No stream	Sinous channel	Stream channel straight		
4. Wetland to watershed size ratio?		Wetland > 20% of watershed	Wetland 5-20% of watershed	Wetland <5% of watershed		
5. Gradient of wetland?		Gradient < 1% and no outlet	Gradient 1-3%	Gradient > 3%		
6. Dominant vegetation class?		Persistent emergent, foreste scrub-shrub, bogs	Nonpersistent emergents	Open water or Aquatic bed		
7. Wetland vegetation density/distribution?		>90% vegetated & no channels	70-90% vegetated & distributed	21 - 50% distributed	0-20% vegetated	
8. Avg. water depth in growing season?		< 1 ft deep or no open water	> 1 ft deep and < 6.6ft	> 6.6ft deep		
Average Score - Sediment Trapping	**0.0**					

10. NUTRIENTS	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0					
2. Sediment Trapping Score?	0.0					
3. Dominant vegetation class (use F9, Q8)	0					
4. Dominant hydroperiod?		Permanent/semipermanent flooding	Seaonal flooding or Saturate	Saturated / temporarily flooded		
5. Dominant soils in wetland?		Very poorly drained soils and not a peatland	Poorly drained soils with leaf litter or fine sediments	Sand, gravel, boulders, bedrock or peatland		
6. Avg. water depth (use F9, Q8)	0.0					
Average Score - Nutrients	**0**					

11. SHORELINE ANCHORING		**10**	**5**	**1**	**0**	**Notes**
1. Gradation of wetland vegetation?		≥ 3 vegetation classes	2 wetland classes	1 wetland class		
2. Vegetation density in wetland?		> 90% cover	70-90% cover	< 70% cover		
3. Width of wetland along water body?		> 20 ft	10-20 ft	< 10 ft		
4. % of wetland edge undisturbed?		> 95%	75-95%	< 75%		

Average Score - Shoreline Anchoring	0

12. NOTEWORTHINESS		10	5	1	0	Notes
1. Critical Wildlife Habitat (NH WAP)?		YES			NO	
2. Wetland in/near Highest Ranked Habitat		YES			NO	
(NH WAP)?		YES			NO	
3. Local significance, high scores, Largest		YES			NO	
4. Local or regional significance?		YES			NO	
5. Locally rare/unique biological		YES			NO	
or geological features		YES			NO	
6. Important historic or archaeologic site?		YES			NO	
7. Connected to designated river?		YES			NO	
8. Wetland in urban setting?		YES			NO	
Average Score - Noteworthiness	0					

Wetland name/code *ND1* *Coldrain Pond* **Date Evaluated:** *6/17/2010*
Wetland area (acres) *xx* **Evaluated by:** *Amanda Stone*
Watershed area (acres) *xxx*

Do not enter data into cells highlighted in blue. These cells contain formulas that automatically carry data over from function to function, or total and average functional scores.

1. ECOLOGICAL INTEGRITY	Score	10	5	1	0	Notes
1. Water quality (sediment/nutrients)?		No sources	1-2 sources	> 3 sources		
2. Fill in Wetland?		Less than 1%	1-3%	3%		
3. Agriculture in wetland?		Less than 5%	5-25%	> 25%		
4. Logging activity in wetland?		Less than 1%	1-10%	> 10%		
5. Human activity in wetland?		Low	Moderate	High		
6. Invasive plants in wetland?		< 5%	5-30%	>30%		
7. Road/driveway/railroad crossings?		None	One	Two or more		
8. Human activity in upland?		Low	Moderate	High		
9. Buildings within 500 ft?		> 50 acres/bldg	11-50 acres/bldg	< 10 acres/bldg		
10. Water level control structure?		None	Bridge/culvert >10 ft	Culvert <10'/clogged	No stream	
Average Score - Ecological Integrity	**0**					

2. WETLAND WILDLIFE HABITAT	Score	10	5	1	0	Notes
1. Wetland acres?		> 100 acres	20-100 acres	<20 acres		
2. Ecological Integrity Avg. score?	0					
3. Water quality (Use F1, Q1 score)?	0					
4. Open water < 6.6ft deep?		> 3 acres	0.5 - 3 acres	< 0.5 acre		
5. Deepwater Habitats?		stream ≥ 1 mile or lake/pond ≥10acre	stream < 1 mile or lake/pond <10acre		No deepwater	
6. Wetland vegetation class diversity?		3 or more classes	2 classes	1 class		
7. Proximity to other wetlands?		connected/unconnected within 0.25 mile	connected 0.5-1mi. Or unconnected 0.25-0.5 mi.	Not connected or > 0.5 mi. from unconnected		
8. Wildlife travel corridors?		Free access	Access partially blocked	Access blocked		
9. % of wetland edge undisturbed?		>95%	75-95%	< 75%		
10. Invasive plants (Use F1, Q6 score)	0					
Average Score - Wildlife Habitat	**0**					

3. FISH & AQUATIC HABITAT	Score	10	5	1	0	Notes
1. Dominant land use in watershed?		Woodland, wetland, inactive	Active farm/rural res	Urban & heavily developed		
		farmland				
2. Water Quality? (use F1, Q1 score)	0					
3. Open water?(use F2, Q4 score)	0					
4. Deepwater habitats > 6.6 ft deep?		> 100 acres	10-100 acres	< 10 acres	Not present	
5. Stream width in wetland?		> 50 ft	25-50 ft	< 25 ft	Not present	
6. Alteration of stream channel?		Natural channel / low gradient or steep gradient w/ riffles	Recently modified or formerly channelized	Recently channelized or stream in non-vegetated chute/pipe	Not present	

7. Diversity of substrate types?		4 or more substrates	2-3 substrates	1 substrate		
8. Coarse woody material and large rocks?		> 10% of cover in water	< 10% of cover in water	No visible cover	No open water	
10. Barriers to aquatic life?		No barriers	Artificial barrier with provision for passage	Barrier with no provision for passage	No open water	
9. Floating & submerged vegetation?		> 70% cover in water	30-70% cover in water	< 30% cover	No open water	
11. Rare or endangered fish or aquatic life?		Documented occurrence in or near wetland	Documented occurrence within 1/2 mi. & suitable habita	No documented occurrence in 1/2 mi. but suitable habitat	No occurrence & no suitable habitat	
Average Score - Fish & Aquatic Habitat	**0**					

4. SCENIC QUALITY	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wetland vegetation classes visible?		≥ 3 classes	2 classes	1 class		
2. Public access?		Public access & trails/road	Public access; no trails	No public access		
3. Visible extent across wetland?		Large expanse	Somewhat restricted view	Forested; no view		
4. Open water visible?		> 3 acres	1-3 acres	< 1 acre		
5. Visual contrast with landforms?		High level of contrast	Some visual contrast	Little contrast or developed		
6. Diversity of plants (flowers, fall color…)?		High level of diversity	Moderate level diversity	Low or no diversity		
7. General appearance of wetland?		Undisturbed & natural	Minor visual detractors	Severe visual detractors		
Average Score - Scenic Quality	**0**					

5. EDUCATIONAL POTENTIAL	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Ecological Integrity Score?	0					
2. Wildlife Habitat Score?	0					
3. Public access? (use F4, Q2 score)?	0					
4. Adequate parking for 10-15 cars or bus?		< 5 mins from site	10-15 min walk from site	> 15 mins walk / no parking		
5. Wetland vegetation classes accessible?		≥ 3 classes	2 classes	1 class		
6. Access to perennial stream / pond?		Direct water access	Access 5 mins or less	No access or no water		
7. Scenic Quality Score?	0					
8. Disabled access		Yes			No	
Average Score - Education	**0**					

6. WETLAND RECREATION	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wildlife Habitat Score?	0					
2. Open water access (canoes & kayaks)?		Open water & easy access	open water; limited access	No open water or access		
3. Hiking, Fishing, Hunting?		Maintained trails present	Trails but not maintained	No trails		
4. Off-road parking for two or more cars?		< 5 mins from site	5-10 min walk from site	> 10 mins walk or no parking		
5. Scenic Quality Score?	0					
Average Score - Wetland Recreation	**0**					

7. FLOOD WATER STORAGE	**Score**	**10**	**5**	**1**	**0**	**Notes**
Use separate Flood Storage Index worksheet						

Field work is not needed for this function						
Average Score - Flood Storage	**0**					

8. GROUNDWATER	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Stratified drift aquifer beneath wetland?		Wetland overlies aquifer	Wetland adjacent to aquifer	No aquifer beneath or adjacent		
2. Public water supply area?		Wetland in in Favorable Gravel Well area	Wetland adjacent to Favorable Gravel Well area	No Favorable Gravel Well area		
3. Dominant soil type within 500 ft?		> 50% of Table 3 soils	25-50% of Table 3 soils	< 25% ofTable 3 soils		
Average Score - Groundwater	**0**					

9. SEDIMENT TRAPPING	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0.0					
2. Wetland outlet?		No outlet	Constricted outlet	Outlet not constricted or flow within stream channel		
3. Shape of stream channel in wetland?		No stream	Sinous channel	Stream channel straight		
4. Wetland to watershed size ratio?		Wetland > 20% of watershed	Wetland 5-20% of watershed	Wetland <5% of watershed		
5. Gradient of wetland?		Gradient < 1% and no outlet	Gradient 1-3%	Gradient > 3%		
6. Dominant vegetation class?		Persistent emergent, foreste scrub-shrub, bogs	Nonpersistent emergents	Open water or Aquatic bed		
7. Wetland vegetation density/distribution?		>90% vegetated & no channels	70-90% vegetated & distributed	21 - 50% distributed	0-20% vegetated	
8. Avg. water depth in growing season?		< 1 ft deep or no open water	> 1 ft deep and < 6.6ft	> 6.6ft deep		
Average Score - Sediment Trapping	**0.0**					

10. NUTRIENTS	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0					
2. Sediment Trapping Score?	0.0					
3. Dominant vegetation class (use F9, Q8)	0					
4. Dominant hydroperiod?		Permanent/semipermanent flooding	Seaonal flooding or Saturate	Saturated / temporarily flooded		
5. Dominant soils in wetland?		Very poorly drained soils and not a peatland	Poorly drained soils with leaf litter or fine sediments	Sand, gravel, boulders, bedrock or peatland		
6. Avg. water depth (use F9, Q8)	0.0					
Average Score - Nutrients	**0**					

11. SHORELINE ANCHORING		**10**	**5**	**1**	**0**	**Notes**
1. Gradation of wetland vegetation?		≥ 3 vegetation classes	2 wetland classes	1 wetland class		
2. Vegetation density in wetland?		> 90% cover	70-90% cover	< 70% cover		
3. Width of wetland along water body?		> 20 ft	10-20 ft	< 10 ft		
4. % of wetland edge undisturbed?		> 95%	75-95%	< 75%		

Average Score - Shoreline Anchoring	0

12. NOTEWORTHINESS		10	5	1	0	Notes
1. Critical Wildlife Habitat (NH WAP)?		YES			NO	
2. Wetland in/near Highest Ranked Habitat		YES			NO	
(NH WAP)?		YES			NO	
3. Local significance, high scores, Largest		YES			NO	
4. Local or regional significance?		YES			NO	
5. Locally rare/unique biological		YES			NO	
or geological features		YES			NO	
6. Important historic or archaeologic site?		YES			NO	
7. Connected to designated river?		YES			NO	
8. Wetland in urban setting?		YES			NO	
Average Score - Noteworthiness	**0**					

Wetland name/code *ND1* *Coldrain Pond* **Date Evaluated:** *6/17/2010*
Wetland area (acres) *xx* **Evaluated by:** *Amanda Stone*
Watershed area (acres) *xxx*

Do not enter data into cells highlighted in blue. These cells contain formulas that automatically carry data over from function to function, or total and average functional scores.

1. ECOLOGICAL INTEGRITY	Score	10	5	1	0	Notes
1. Water quality (sediment/nutrients)?		No sources	1-2 sources	> 3 sources		
2. Fill in Wetland?		Less than 1%	1-3%	3%		
3. Agriculture in wetland?		Less than 5%	5-25%	> 25%		
4. Logging activity in wetland?		Less than 1%	1-10%	> 10%		
5. Human activity in wetland?		Low	Moderate	High		
6. Invasive plants in wetland?		< 5%	5-30%	>30%		
7. Road/driveway/railroad crossings?		None	One	Two or more		
8. Human activity in upland?		Low	Moderate	High		
9. Buildings within 500 ft?		> 50 acres/bldg	11-50 acres/bldg	< 10 acres/bldg		
10. Water level control structure?		None	Bridge/culvert >10 ft	Culvert <10'/clogged	No stream	
Average Score - Ecological Integrity	**0**					

2. WETLAND WILDLIFE HABITAT	Score	10	5	1	0	Notes
1. Wetland acres?		> 100 acres	20-100 acres	<20 acres		
2. Ecological Integrity Avg. score?	0					
3. Water quality (Use F1, Q1 score)?	0					
4. Open water < 6.6ft deep?		> 3 acres	0.5 - 3 acres	< 0.5 acre		
5. Deepwater Habitats?		stream ≥ 1 mile or lake/pond ≥10acre	stream < 1 mile or lake/pond <10acre		No deepwater	
6. Wetland vegetation class diversity?		3 or more classes	2 classes	1 class		
7. Proximity to other wetlands?		connected/unconnected within 0.25 mile	connected 0.5-1mi. Or unconnected 0.25-0.5 mi.	Not connected or > 0.5 mi. from unconnected		
8. Wildlife travel corridors?		Free access	Access partially blocked	Access blocked		
9. % of wetland edge undisturbed?		>95%	75-95%	< 75%		
10. Invasive plants (Use F1, Q6 score)	0					
Average Score - Wildlife Habitat	**0**					

3. FISH & AQUATIC HABITAT	Score	10	5	1	0	Notes
1. Dominant land use in watershed?		Woodland, wetland, inactive	Active farm/rural res	Urban & heavily developed		
		farmland				
2. Water Quality? (use F1, Q1 score)	0					
3. Open water?(use F2, Q4 score)	0					
4. Deepwater habitats > 6.6 ft deep?		> 100 acres	10-100 acres	< 10 acres	Not present	
5. Stream width in wetland?		> 50 ft	25-50 ft	< 25 ft	Not present	
6. Alteration of stream channel?		Natural channel / low gradient or steep gradient w/ riffles	Recently modified or formerly channelized	Recently channelized or stream in non-vegetated chute/pipe	Not present	

7. Diversity of substrate types?		4 or more substrates	2-3 substrates	1 substrate		
8. Coarse woody material and large rocks?		> 10% of cover in water	< 10% of cover in water	No visible cover	No open water	
10. Barriers to aquatic life?		No barriers	Artificial barrier with provision for passage	Barrier with no provision for passage	No open water	
9. Floating & submerged vegetation?		> 70% cover in water	30-70% cover in water	< 30% cover	No open water	
11. Rare or endangered fish or aquatic life?		Documented occurrence in or near wetland	Documented occurrence within 1/2 mi. & suitable habita	No documented occurrence in 1/2 mi. but suitable habitat	No occurrence & no suitable habitat	
Average Score - Fish & Aquatic Habitat	**0**					

4. SCENIC QUALITY	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wetland vegetation classes visible?		≥ 3 classes	2 classes	1 class		
2. Public access?		Public access & trails/road	Public access; no trails	No public access		
3. Visible extent across wetland?		Large expanse	Somewhat restricted view	Forested; no view		
4. Open water visible?		> 3 acres	1-3 acres	< 1 acre		
5. Visual contrast with landforms?		High level of contrast	Some visual contrast	Little contrast or developed		
6. Diversity of plants (flowers, fall color…)?		High level of diversity	Moderate level diversity	Low or no diversity		
7. General appearance of wetland?		Undisturbed & natural	Minor visual detractors	Severe visual detractors		
Average Score - Scenic Quality	**0**					

5. EDUCATIONAL POTENTIAL	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Ecological Integrity Score?	0					
2. Wildlife Habitat Score?	0					
3. Public access? (use F4, Q2 score)?	0					
4. Adequate parking for 10-15 cars or bus?		< 5 mins from site	10-15 min walk from site	> 15 mins walk / no parking		
5. Wetland vegetation classes accessible?		≥ 3 classes	2 classes	1 class		
6. Access to perennial stream / pond?		Direct water access	Access 5 mins or less	No access or no water		
7. Scenic Quality Score?	0					
8. Disabled access		Yes			No	
Average Score - Education	**0**					

6. WETLAND RECREATION	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wildlife Habitat Score?	0					
2. Open water access (canoes & kayaks)?		Open water & easy access	open water; limited access	No open water or access		
3. Hiking, Fishing, Hunting?		Maintained trails present	Trails but not maintained	No trails		
4. Off-road parking for two or more cars?		< 5 mins from site	5-10 min walk from site	> 10 mins walk or no parking		
5. Scenic Quality Score?	0					
Average Score - Wetland Recreation	**0**					

7. FLOOD WATER STORAGE	**Score**	**10**	**5**	**1**	**0**	**Notes**
Use separate Flood Storage Index worksheet						

Field work is not needed for this function						
Average Score - Flood Storage	**0**					

8. GROUNDWATER	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Stratified drift aquifer beneath wetland?		Wetland overlies aquifer	Wetland adjacent to aquifer	No aquifer beneath or adjacent		
2. Public water supply area?		Wetland in in Favorable Gravel Well area	Wetland adjacent to Favorable Gravel Well area	No Favorable Gravel Well area		
3. Dominant soil type within 500 ft?		> 50% of Table 3 soils	25-50% of Table 3 soils	< 25% ofTable 3 soils		
Average Score - Groundwater	**0**					

9. SEDIMENT TRAPPING	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0.0					
2. Wetland outlet?		No outlet	Constricted outlet	Outlet not constricted or flow within stream channel		
3. Shape of stream channel in wetland?		No stream	Sinous channel	Stream channel straight		
4. Wetland to watershed size ratio?		Wetland > 20% of watershed	Wetland 5-20% of watershed	Wetland <5% of watershed		
5. Gradient of wetland?		Gradient < 1% and no outlet	Gradient 1-3%	Gradient > 3%		
6. Dominant vegetation class?		Persistent emergent, foreste scrub-shrub, bogs	Nonpersistent emergents	Open water or Aquatic bed		
7. Wetland vegetation density/distribution?		>90% vegetated & no channels	70-90% vegetated & distributed	21 - 50% distributed	0-20% vegetated	
8. Avg. water depth in growing season?		< 1 ft deep or no open water	> 1 ft deep and < 6.6ft	> 6.6ft deep		
Average Score - Sediment Trapping	**0.0**					

10. NUTRIENTS	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0					
2. Sediment Trapping Score?	0.0					
3. Dominant vegetation class (use F9, Q8)	0					
4. Dominant hydroperiod?		Permanent/semipermanent flooding	Seaonal flooding or Saturate	Saturated / temporarily flooded		
5. Dominant soils in wetland?		Very poorly drained soils and not a peatland	Poorly drained soils with leaf litter or fine sediments	Sand, gravel, boulders, bedrock or peatland		
6. Avg. water depth (use F9, Q8)	0.0					
Average Score - Nutrients	**0**					

11. SHORELINE ANCHORING		**10**	**5**	**1**	**0**	**Notes**
1. Gradation of wetland vegetation?		≥ 3 vegetation classes	2 wetland classes	1 wetland class		
2. Vegetation density in wetland?		> 90% cover	70-90% cover	< 70% cover		
3. Width of wetland along water body?		> 20 ft	10-20 ft	< 10 ft		
4. % of wetland edge undisturbed?		> 95%	75-95%	< 75%		

Average Score - Shoreline Anchoring	0

12. NOTEWORTHINESS		10	5	1	0	Notes
1. Critical Wildlife Habitat (NH WAP)?		YES			NO	
2. Wetland in/near Highest Ranked Habitat		YES			NO	
(NH WAP)?		YES			NO	
3. Local significance, high scores, Largest		YES			NO	
4. Local or regional significance?		YES			NO	
5. Locally rare/unique biological		YES			NO	
or geological features		YES			NO	
6. Important historic or archaeologic site?		YES			NO	
7. Connected to designated river?		YES			NO	
8. Wetland in urban setting?		YES			NO	
Average Score - Noteworthiness	**0**					

Wetland name/code *ND1* *Coldrain Pond* **Date Evaluated:** *6/17/2010*
Wetland area (acres) *xx* **Evaluated by:** *Amanda Stone*
Watershed area (acres) *xxx*

Do not enter data into cells highlighted in blue. These cells contain formulas that automatically carry data over from function to function, or total and average functional scores.

1. ECOLOGICAL INTEGRITY	Score	10	5	1	0	Notes
1. Water quality (sediment/nutrients)?	5	No sources	1-2 sources	> 3 sources		
2. Fill in Wetland?	10	Less than 1%	1-3%	3%		
3. Agriculture in wetland?	7.5	Less than 5%	5-25%	> 25%		
4. Logging activity in wetland?	10	Less than 1%	1-10%	> 10%		
5. Human activity in wetland?	10	Low	Moderate	High		
6. Invasive plants in wetland?	5	< 5%	5-30%	>30%		
7. Road/driveway/railroad crossings?	7.5	None	One	Two or more		
8. Human activity in upland?	1	Low	Moderate	High		
9. Buildings within 500 ft?	5	> 50 acres/bldg	11-50 acres/bldg	< 10 acres/bldg		
10. Water level control structure?	10	None	Bridge/culvert >10 ft	Culvert <10'/clogged	No stream	
Average Score - Ecological Integrity	**7.1**					

2. WETLAND WILDLIFE HABITAT	Score	10	5	1	0	Notes
1. Wetland acres?		> 100 acres	20-100 acres	<20 acres		
2. Ecological Integrity Avg. score?	7.1					
3. Water quality (Use F1, Q1 score)?	5					
4. Open water < 6.6ft deep?		> 3 acres	0.5 - 3 acres	< 0.5 acre		
5. Deepwater Habitats?		stream ≥ 1 mile or lake/pond ≥10acre	stream < 1 mile or lake/pond <10acre		No deepwater	
6. Wetland vegetation class diversity?		3 or more classes	2 classes	1 class		
7. Proximity to other wetlands?		connected/unconnected within 0.25 mile	connected 0.5-1mi. Or unconnected 0.25-0.5 mi.	Not connected or > 0.5 mi. from unconnected		
8. Wildlife travel corridors?		Free access	Access partially blocked	Access blocked		
9. % of wetland edge undisturbed?		>95%	75-95%	< 75%		
10. Invasive plants (Use F1, Q6 score)	5					
Average Score - Wildlife Habitat	**1.71**					

3. FISH & AQUATIC HABITAT	Score	10	5	1	0	Notes
1. Dominant land use in watershed?		Woodland, wetland, inactive	Active farm/rural res	Urban & heavily developed		
		farmland				
2. Water Quality? (use F1, Q1 score)	5					
3. Open water?(use F2, Q4 score)	0					
4. Deepwater habitats > 6.6 ft deep?		> 100 acres	10-100 acres	< 10 acres	Not present	
5. Stream width in wetland?		> 50 ft	25-50 ft	< 25 ft	Not present	
6. Alteration of stream channel?		Natural channel / low gradient or steep gradient w/ riffles	Recently modified or formerly channelized	Recently channelized or stream in non-vegetated chute/pipe	Not present	

7. Diversity of substrate types?		4 or more substrates	2-3 substrates	1 substrate		
8. Coarse woody material and large rocks?		> 10% of cover in water	< 10% of cover in water	No visible cover	No open water	
10. Barriers to aquatic life?		No barriers	Artificial barrier with provision for passage	Barrier with no provision for passage	No open water	
9. Floating & submerged vegetation?		> 70% cover in water	30-70% cover in water	< 30% cover	No open water	
11. Rare or endangered fish or aquatic life?		Documented occurrence in or near wetland	Documented occurrence within 1/2 mi. & suitable habita	No documented occurrence in 1/2 mi. but suitable habitat	No occurrence & no suitable habitat	
Average Score - Fish & Aquatic Habitat	**0.454545**					

4. SCENIC QUALITY	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wetland vegetation classes visible?		≥ 3 classes	2 classes	1 class		
2. Public access?		Public access & trails/road	Public access; no trails	No public access		
3. Visible extent across wetland?		Large expanse	Somewhat restricted view	Forested; no view		
4. Open water visible?		> 3 acres	1-3 acres	< 1 acre		
5. Visual contrast with landforms?		High level of contrast	Some visual contrast	Little contrast or developed		
6. Diversity of plants (flowers, fall color…)?		High level of diversity	Moderate level diversity	Low or no diversity		
7. General appearance of wetland?		Undisturbed & natural	Minor visual detractors	Severe visual detractors		
Average Score - Scenic Quality	**0**					

5. EDUCATIONAL POTENTIAL	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Ecological Integrity Score?	1.71					
2. Wildlife Habitat Score?	1.71					
3. Public access? (use F4, Q2 score)?	0					
4. Adequate parking for 10-15 cars or bus?		< 5 mins from site	10-15 min walk from site	> 15 mins walk / no parking		
5. Wetland vegetation classes accessible?		≥ 3 classes	2 classes	1 class		
6. Access to perennial stream / pond?		Direct water access	Access 5 mins or less	No access or no water		
7. Scenic Quality Score?	0					
8. Disabled access		Yes			No	
Average Score - Education	**0.4275**					

6. WETLAND RECREATION	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Wildlife Habitat Score?	1.71					
2. Open water access (canoes & kayaks)?		Open water & easy access	open water; limited access	No open water or access		
3. Hiking, Fishing, Hunting?		Maintained trails present	Trails but not maintained	No trails		
4. Off-road parking for two or more cars?		< 5 mins from site	5-10 min walk from site	> 10 mins walk or no parking		
5. Scenic Quality Score?	0					
Average Score - Wetland Recreation	**0.342**					

7. FLOOD WATER STORAGE	**Score**	**10**	**5**	**1**	**0**	**Notes**
Use separate Flood Storage Index worksheet						

Field work is not needed for this function						
Average Score - Flood Storage	**0**					

8. GROUNDWATER	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Stratified drift aquifer beneath wetland?		Wetland overlies aquifer	Wetland adjacent to aquifer	No aquifer beneath or adjacent		
2. Public water supply area?		Wetland in in Favorable Gravel Well area	Wetland adjacent to Favorable Gravel Well area	No Favorable Gravel Well area		
3. Dominant soil type within 500 ft?		> 50% of Table 3 soils	25-50% of Table 3 soils	< 25% ofTable 3 soils		
Average Score - Groundwater	**0**					

9. SEDIMENT TRAPPING	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0.0					
2. Wetland outlet?		No outlet	Constricted outlet	Outlet not constricted or flow within stream channel		
3. Shape of stream channel in wetland?		No stream	Sinous channel	Stream channel straight		
4. Wetland to watershed size ratio?		Wetland > 20% of watershed	Wetland 5-20% of watershed	Wetland <5% of watershed		
5. Gradient of wetland?		Gradient < 1% and no outlet	Gradient 1-3%	Gradient > 3%		
6. Dominant vegetation class?		Persistent emergent, foreste scrub-shrub, bogs	Nonpersistent emergents	Open water or Aquatic bed		
7. Wetland vegetation density/distribution?		>90% vegetated & no channels	70-90% vegetated & distributed	21 - 50% distributed	0-20% vegetated	
8. Avg. water depth in growing season?		< 1 ft deep or no open water	> 1 ft deep and < 6.6ft	> 6.6ft deep		
Average Score - Sediment Trapping	**0.0**					

10. NUTRIENTS	**Score**	**10**	**5**	**1**	**0**	**Notes**
1. Flood Storage Score?	0					
2. Sediment Trapping Score?	0.0					
3. Dominant vegetation class (use F9, Q8)	0					
4. Dominant hydroperiod?		Permanent/semipermanent flooding	Seaonal flooding or Saturate	Saturated / temporarily flooded		
5. Dominant soils in wetland?		Very poorly drained soils and not a peatland	Poorly drained soils with leaf litter or fine sediments	Sand, gravel, boulders, bedrock or peatland		
6. Avg. water depth (use F9, Q10)	0.0					
Average Score - Nutrients	**0**					

11. SHORELINE ANCHORING		**10**	**5**	**1**	**0**	**Notes**
1. Gradation of wetland vegetation?		≥ 3 vegetation classes	2 wetland classes	1 wetland class		
2. Vegetation density in wetland?		> 90% cover	70-90% cover	< 70% cover		
3. Width of wetland along water body?		> 20 ft	10-20 ft	< 10 ft		
4. % of wetland edge undisturbed?		> 95%	75-95%	< 75%		

Average Score - Shoreline Anchoring	0

12. NOTEWORTHINESS		10	5	1	0	Notes
1. Critical Wildlife Habitat (NH WAP)?		YES			NO	
2. Wetland in/near Highest Ranked Habitat		YES			NO	
(NH WAP)?		YES			NO	
3. Local significance, high scores, Largest		YES			NO	
4. Local or regional significance?		YES			NO	
5. Locally rare/unique biological		YES			NO	
or geological features		YES			NO	
6. Important historic or archaeologic site?		YES			NO	
7. Connected to designated river?		YES			NO	
8. Wetland in urban setting?		YES			NO	
Average Score - Noteworthiness	**0**					

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: Evaluation Date: Evaluator:

1 – ECOLOGICAL INTEGRITY

Evaluation Questions	Observations &Notes	Answers	Score
1. Has water quality in the wetland been degraded by land use **in the wetland's watershed**?		a. No sediment or nutrient sources in the subwatershed b. Some (1-2 sources) sediment or nutrient sources in the subwatershed c. Many (more than 3 sources) nutrient sources in the subwatershed	(10) 5 1
2. Is there evidence of fill **in the wetland**?		a. Less than 1 % b. From 1-3 % c. More than 3 %	(10) 5 1
3. What percentage **of the wetland** has been altered by agricultural activities?		a. Less than 5 % b. From 5 to 25 % c. More than 25 %	(10) 5 1
4. What percentage **of the wetland** has been adversely impacted by logging activity within the last 10 years?		a. Less than 1% b. From 1 to 10 % c. More than 10 %	(10) 5 1
5. How much human activity is taking place **in the wetland** (e.g. ATV use, trails, cars, dumping of brush and garbage, etc.)?		a. Low: Few trails in use, little or no traffic, and little or no litter. b. Moderate: Some used trails, roads, litter c. High: Many trails, roads, and/or litter	(10) 5 1
6. What percentage **of the wetland** is occupied by invasive plant species?		a. Less than 5% b. From 5 to 30% c. More than 30%	(10) 5 1
7. How many times does a road, driveway, and/or railroad cross or border the wetland?		a. None b. One c. Two or more	10 (5) 1
8. How much human activity is taking place **in the upland** within 500 feet of the wetland edge?		a. Low: Little or no activity b. Moderate: some activity evident c. High: Much activity evident.	10 (5) 1
9. How many buildings are there within 500 feet of the wetland edge? *Acres of Wetland/ # of buildings*		a. More than 50 wetland acres per building b. 11-50 wetland acres per building c. Less than 10 wetland acres per bldg	10 (5) 1
10. Is there a human-made structure that controls water level, or is undersized, present in the wetland or in the water body directly connected to the wetland?		a. No human-made structures present b. Bridge or large culvert >10 ft across is present and is not clogged. c. Culvert is less than 10 ft across, and existing structure is clogged, has failed or is not maintained, or road crossing with no culvert d. No stream present	(10) 5 1 0

AVERAGE SCORE FOR ECOLOGICAL INTEGRITY)
(Add scores for each question and divide by 10) 8.5

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: Evaluation Date: Evaluator:

2 – WETLAND-DEPENDENT WILDLIFE HABITAT

Evaluation Questions	Observations & Notes	Answers	Score
1. What is the wetland acreage?		a. More than 100 acres b. From 20 - 100 acres c. Less than 20 acres	10 (5) 1
2. What is the score for Ecological Integrity?		Average score for **Ecological Integrity**	8.5
3. Has water quality in the wetland been degraded by land use **in the watershed**?		Record Answer from **Ecological Integrity**, Question 1	10
4. What is the area of shallow permanent open water less than 6.6 feet deep, including streams and shallow ponds that are part of the wetland complex?		a. More than 3 acres b. From 0.5 to 3 acres c. Less than 0.5 acre	10 (5) 1
5. Is there deepwater habitat (lakes or ponds >6.6ft deep) and/or 4th order or higher rivers associated with the wetland?		a. Deepwater stream ≥1 mile long and/or lake or pond ≥10 acres present b. Deepwater stream < 1 mile long and/or lake or pond < 10 acres present c. No deepwater stream, lake or pond present	10 (5) 1
6. What is the diversity of vegetation classes in the wetland?		a. Three or more wetland classes (including islands) present b. Two wetland classes (including islands) present c. One wetland class present	(10) 5 1
7. Are other wetlands in close proximity to the study wetland?		a. Other connected or unconnected wetlands within a 0.25 mile distance b. Wetland connected to other wetlands within a 0.5 to 1 mile distance by perennial stream or lake, **OR** other unconnected wetlands are present within a 0.25 to 0.5 mile distance c. Wetland not hydrologically connected to other wetlands within 1 mile and more than 0.5 miles from other unconnected wetlands.	(10) 5 1

Wetland Name/Code: Evaluation Date: Evaluator:

2 – WETLAND-DEPENDENT WILDLIFE HABITAT (continued)

Evaluation Questions	Observations & Notes	Answers	Score
8. Are there wildlife travel corridors allowing access to other wetlands?		a. Free access along well vegetated stream corridor, woodland, or lakeshore b. Access partially blocked by roads, urban areas, or other obstructions c. Access blocked by roads, urban areas, or other obstructions	(10) 5 1
9. What percentage of the wetland edge is bordered by undisturbed woodland or idle land (e.g. shrub land or abandoned fields) at least 500 feet in width?		a. More than 95% of the wetland b. More than 75-95% of the wetland c. Less than 75% of the wetland	10 (5) 1
10. What percentage of the wetland is occupied by invasive plant species?		Record Answer from **Ecological Integrity**, Question 6	10
AVERAGE SCORE FOR WILDLIFE HABITAT (Add scores for each question and divide by 10)			7.35

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: Evaluation Date: Evaluator:

7 –FLOODWATER STORAGE

Instead of manually calculating the Wetland Flood Index on this data sheet, you can use the Flood Index Worksheet, an Excel spreadsheet provided on the NH Method website (link), which is set up to do all the calculations for you. An example of the spreadsheet is provided in Table 3, below.

Note that this function is scored somewhat differently from the other NH Method function. A series of factors are developed that are then use to derive the Flood Storage Index. The numerical scores for the factors do not correspond to the 10, 5, 1, 0 scoring scale used in the other functions.

In the following situations, the Flood Value Index does not need to be calculated for the wetland being studied. Instead a certain flood index range can be assumed:

1. Wetlands with slopes greater than 10% (10' vertical :100' horizontal) as measured along the flow path, where it is obvious that little flood attenuation could occur, **should be assigned a Low Flood Index Value range (0.0 to 1.0).**
2. For large ponds or lakes or wetlands greater than 200 acres and streams that are Fourth Order or higher (i.e. 4th, 5th, 6th etc.) **assign a High Flood Index Value range (7.6 to 10.0)**

Evaluation Questions	Observations and Notes	Answers	Factor
1. Determine Wetland Acreage (**W**)		50 acres	0.8
2. Determine Watershed Acreage (**S**)		250 acres	
3. Water Storage Depth (**D**)		a. Assign a default value of 1.0 ft if the actual water storage depth is not known b. Use the actual water storage depth if known	D=1.0 ft D= __ ft
4. Wetland Storage Volume (**V**)		Multiply Water Storage Depth by Wetland acreage: D x A = V	V=50 acre feet
5. Wetland Storage Volume Factor (**F**)		Insert value from Table 1	F=8.5
6. Watershed Area Factor (**A**)		Insert value from Table 2	A=1.0
7. Location of wetland within the watershed (**L**)		a. Wetland located within 1,000 ft of a 4th order or higher stream or a pond/lake that outlets to a 4th order or higher stream. b. Wetland located within 500 ft of a perennial stream (less than 4th order) c. Wetland located > 1,000 ft from a 4th order or higher stream and > 500ft from a perennial stream	1.0 0.8 0.6

SCORE FOR WETLAND FLOOD INDEX = F x A x L x 10 6.8

Use the score to locate the Value Range below and assign Flood Index Value Mod – High

Wetland Flood Index Value Range	Flood Value Type
0.0 – 1.0	Low Flood Value
1.0 – 2.5	Low to Moderate Flood Value
2.6 – 5.0	Moderate Flood Value

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: Evaluation Date: Evaluator:

5.1 – 7.5 Moderate to High Flood Value

7.6 – 10.0 High Flood Value

Table 1

Wetland Storage Volume factor (F)

Wetland Storage volume (V)	Value of F
≥ 200	1.000
150	0.950
100	0.900
75	0.850
50	0.800
37.5	0.750
25	0.700
18.75	0.650
12.5	0.600
9.375	0.550
6.25	0.500
4.69	0.450
3.125	0.400
2.36	0.350
1.6	0.300
1.2	0.250
0.8	0.200
0.6	0.150
0.4	0.100
0.3	0.075
0.2	0.050
0.15	0.037
0.1	0.025
0.5	0.012
0	0.000

Table 2

Watershed Area factor (A)

Value for P: Wetl. area/Wshed Area x 100	Value for A
≥10%	1.00
9%	0.95
8%	0.90
7%	0.85
6%	0.80
5%	0.75
4%	0.70
3%	0.65
2%	0.60
1%	0.55
< 1%	0.50

EXAMPLES OF WETLAND FLOOD INDEX CALCULATION:

Example 1: *(See Wetland I.D. 1 in spreadsheet)*

Wetland Area (W) = 0.25 acres
Watershed Area (S) = 25 acres
Water Storage Depth (D) = 0.5 ft (known depth)
Water Storage Volume (V) = 0.5 ft x 0.25 acres = 0.125 acre-feet
Wetland Storage Volume Factor (F) = 0.03 (from Table 1)
Watershed Area Factor (A) = 0.55 (from Table 2, where 0.25 acres/25 acres x 100 = 1%)
Location in Watershed (L) = 0.8
Wetland Flood Index = 0.03 x 0.55 x 0.80 = 0.0132
Flood Value Type = Low Flood Value

Example 2: *(see Wetland I.D. W3 in spreadsheet)*

Wetland Area (W) = 33 acres
Watershed Area (S) = 17,937 acres
Water Storage Depth (D)= 1.0 ft (default value)
Water Storage Volume (V) = 1.0 ft x 33 acres = 33 acre-feet
Wetland Storage Volume Factor (F) = 0.73 (from Table 1)

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: Evaluation Date: Evaluator:

Watershed Area Factor (A) = 0.5 (from Table 2, where 33 acres/17,937 acres x 100 = 0.18%)
Location in Watershed (L)= 1.0
Wetland Flood Index ValueType = 0.73 x 0.5 x 1.0 = 3.65
Flood Value = Moderate Flood Value

Wetland Name/Code: Evaluation Date: Evaluator:

Table 3: Example of Flood Index Worksheet for Multiple Wetlands

Use the Excel spreadsheet on the NH Method Webiste (link) for automated calculation of the Flood Water Storage Index

Flood Index = (F x A x L) x 10
Where:
Maximum Wetland Storage Volume = 200 acre-ft
Maxiumum Wetland Flood Function Value = 10

"Red" headings indicate data input columns
"Black" headings indicate columns where the figures are automatically calculated

Wetland I.D.	Wetland Acreage (W)	Watershed Acreage (S)	Wetland Area as % of Watershed (P) from Table 2	Watershed Area Factor (A) Table 2	Location in Watershed (L) (1.0/0.8/0.6)	Water Storage Depth feet (D) 1.0 = default	Wetland Storage Volume acre feet (D) acre feet	Wetland Storage Volume Factor (F) Table 1	Flood Index
1	0.25	25	1.00	0.55	0.8	0.5	0.125	0.03	**0.132**
2	0.75	15	5.00	0.75	1	1	0.75	0.19	**1.425**
3	2	50	4.00	0.7	0.8	2.5	5	0.46	**2.576**
4	10	100	10.00	1	1	3	30	0.72	**7.200**
5	10	1000	1.00	1	1	4	40	0.77	**7.700**
6	3	47	6.38	0.81	0.8	2	6	0.48	**3.110**
7	0.1	3	3.33	0.42	0.6	0.5	0.05	0.016	**0.040**
8	0.75	20	3.75	0.68	0.6	0.15	0.1125	0.027	**0.110**
9	1	50	2.00	0.6	1	2.5	2.5	0.35	**2.100**
10	50	400	12.50	1	0.8	3	150	0.95	**7.600**
			#DIV/0!				0	0	**0.000**
W1	283	19548	1.45	0.57	1	1	283	1	**5.700**
W3	33	17937	0.18	0.5	1	1	33	0.73	**3.650**
W4	54	17291	0.31	0.5	1	1	54	0.73	**3.650**
W5	202	16619	1.22	0.56	1	1	202	1	**5.600**
W6	175	2664	6.57	0.82	1	1	175	0.95	**7.790**
W7	40	446	8.97	0.94	1	1	40	0.78	**7.332**
W8	24	380	6.32	0.51	1	1	24	0.69	**3.519**
W9	43	679	6.33	0.51	1	1	43	0.77	**3.927**
W10	116	2161	5.37	0.77	1	1	116	0.92	**7.084**
W11	63	880	7.16	0.86	1	1	63	0.83	**7.138**
W12	24	3302	0.73	0.86	1	1	24	0.69	**5.934**
			#DIV/0!				0	0	**0.000**
ND1	93.7	5169	1.81	0.57	1	1		0.88	**5.016**
ND2	50	3741	1.34	0.57	1	1	50	0.8	**4.560**
ND3	37	258	14.34	1	1	1	37	0.75	**7.500**
ND4	101	2700	3.74	0.68	1	1	101	0.9	**6.120**
ND5	110.5	562	19.66	1	1	1	110.5	0.92	**9.200**
ND6	99	1753	5.65	0.77	1	1	99	0.9	**6.930**

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: Evaluation Date: Evaluator:

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: Evaluation Date: Evaluator:

9 – SEDIMENT TRAPPING

Evaluation Questions	Observations &Notes	Answers	Score
1 What is the wetland's Flood Storage value?		Average score from 7 – Flood Water Storage.	7
2 Does the wetland lack outlet or have a constricted outlet?		a. Wetland has no outlet. b. Wetland has constricted outlet. c. Wetland outlet not constricted or flow primarily within stream channel.	10 5 1
3. What is the shape of the stream channel through the wetland?		a. No stream channel evident in wetland b. Sinuous channel,. where the length of the channel is greater than the length of the wetland along the stream. c. Stream channel is straight.	10 5 1
4. What is the ratio of the wetland's size to the size of its watershed? $\frac{\textit{Acres of Wetland}}{\textit{Area of watershed above wetland outlet}} \times 100$		a. Wetland is more than 20% of its watershed. b. Wetland is between 5 to 20% of its watershed. c. Wetland is less than 5% of its watershed.	10 5 1
5. What is the gradient within the wetland?		a. Wetland has gradient less than 1%, is permanently ponded and has no outlet b. Wetland gradient is between 1% and 3%. c. Wetland has a gradient greater than 3%.	10 5 1
6. What is the dominant wetland vegetation class during the growing season?		a. Persistent emergent plants (stems above surface of water of wetland) throughout the year; forested; or scrub/shrub, bogs b. Nonpersistent emergent plants (stems fall below the surface of water of wetland in the fall and during winter. c. Open Water or Aquatic Bed vegetation	10 5 1
7. What is the stem density and vegetation-water interspersion in the wetland?		a. > 90% vegetated & stems well distributed, low interspersion, channel not well defined (J) b. 70 to 90% vegetated, stems well distributed and included within the channel if one is present (low vegetation-water interspersion). (G, H, or I) c. 21 – 50% vegetated, or if greater than 50% vegetated but vegetation does not occur in the usual flow path of surface waters (high vegetation-water interspersion with channel highly evident. (D, E or F) d. 0 – 20% vegetated (A, B or C)	10 5 1 0
8. What is the average water depth in the wetland during growing season?		a. Average water depth is less than 1 foot or there is no open water b. Average water depth greater than 1 foot and less than 6.6 feet. c. Average water depth is greater than 6.6 feet	10 5 1

AVERAGE SCORE FOR SEDIMENT TRAPPING: 8.4

NH METHOD FOR THE EVALUATION OF FRESHWATER WETLANDS

Wetland Name/Code: Evaluation Date: Evaluator:

10 – NUTRIENT REMOVAL/ RETENTION/TRANSFORMATION

Evaluation Questions	Observations &Notes	Answers	Score
1. What is the wetland's flood water storage value?		Average score from 7 – **Flood Water Storage.**	7
2. What is the wetland's ability to trap sediments?		Average score from 9 – **Sediment Trapping.**	8.4
3. What is the dominant wetland vegetation class during the growing season?		Record the answer from **9- Sediment Trapping, Question** ~~8~~ 4	10
4. What is the dominant hydroperiod during the growing season?		a. Permanently flooded; intermittently exposed or semi-permanently flooded b. Seasonally Flooded or Seasonally Flooded/Saturated c. Saturated or Temporarily Flooded	(10) 5 1
5. What are the dominant soils within the wetland?		a. Wetland is dominantly very poorly drained soils and is not a peatland. b. Wetland is predominantly poorly drained soils with leaf litter or fine sediments. c. Sand, gravel, boulders, bedrock or peatlands.	(10) 5 1
6. What is the average depth of water in the wetland during the growing season?		Record the answer from **9-Sediment Trapping, Question 9**	10

AVERAGE SCORE FOR WATER QUALITY MAINTENANCE
(Add scores for each question and divide by ~~9~~ 6) 9.2