



1-2007

Outreach Program to Develop And Implement Local Land Use Regulations to Protect the Remaining Undisturbed Natural Shoreland Buffers in the Towns of Candia and Deerfield, NH

Jack Munn
Southern New Hampshire Planning Commission

Brian Trippe
Southern New Hampshire Planning Commission

Follow this and additional works at: <https://scholars.unh.edu/prep>

 Part of the [Marine Biology Commons](#)

Recommended Citation

Munn, Jack and Trippe, Brian, "Outreach Program to Develop And Implement Local Land Use Regulations to Protect the Remaining Undisturbed Natural Shoreland Buffers in the Towns of Candia and Deerfield, NH" (2007). *PREP Reports & Publications*. 245.
<https://scholars.unh.edu/prep/245>

This Report is brought to you for free and open access by the Institute for the Study of Earth, Oceans, and Space (EOS) at University of New Hampshire Scholars' Repository. It has been accepted for inclusion in PREP Reports & Publications by an authorized administrator of University of New Hampshire Scholars' Repository. For more information, please contact Scholarly.Communication@unh.edu.

Outreach Program to Develop And Implement Local Land Use Regulations to Protect the Remaining Undisturbed Natural Shoreland Buffers in the Towns of Candia and Deerfield, NH

A Final Report to

The New Hampshire Estuaries Project

Submitted by

Jack Munn, AICP Senior Planner and Brian Trippe, Intern/Planner
Southern New Hampshire Planning Commission
Manchester, NH

January, 2007

This project was funded in part by a grant from the New Hampshire Estuaries Project as authorized by the U.S. Environmental Protection Agency's National Estuary Program.



Table of Contents

Executive Summary	3
List of Tables	5
List of Figures and Maps	5
Introduction	6
Project Goals and Objectives	6
Activities and Methods	7
Inventory Results.....	10
Evaluation of Existing Town Regulations.....	14
Actions Needed to Strengthen the Town's Regulations.....	18
Possible Shoreland Protection Approaches.....	19
Results (or Outcomes) and Discussion	23
Proposed Model Ordinance.....	25
Conclusions.....	30
Recommendations (for future work or management strategies).....	30
Appendices	32
Sources	37

Executive Summary

The towns of Candia and Deerfield, New Hampshire, both situated within the Great Bay/Little Bay watershed and the Lamprey River subwatershed have agreed to participate with the Southern New Hampshire Regional Planning Commission (SNHPC) to develop and implement land use regulations to protect the remaining undisturbed natural shoreline buffers along the Lamprey and North Branch Rivers (2nd order or higher streams and tributaries) and other surface waters within these communities.

The project was approached in two overall steps. Step one involved preparing an inventory, delineation and map of the remaining undisturbed natural vegetated buffers in both communities. The focus of this inventory was to identify the undisturbed and intact natural vegetated buffers adjacent to the 2nd order and higher streams and great ponds. Areas that have been disturbed or impacted by development such as roads, buildings and impervious surfaces were deducted from the overall GIS coverages.

No distinction was made in establishing a buffer width or identifying the type of wetland or upland forest as part of the inventory. The primary focus was to identify the remaining undisturbed natural vegetated areas both wetlands and upland forests within the flow path of the water that fills these streams and lakes.

The inventory results indicate that in Candia 36.8 percent of the 138,292 linear feet of the 2nd order or higher streams have some sort of wetland buffering and 47.2 percent of these streams have some sort of natural upland forest buffering directly adjacent to the waters edge.

In Deerfield, 43.0 percent of the 188,839 feet of 2nd order or higher streams have some sort of wetland buffering and 61.8 percent have natural upland forest buffering directly adjacent to the waters edge.

In addition, from a town wide perspective, it was found that approximately 71.6 percent or a majority of the Town of Candia contains undisturbed upland forests (with some scattered residential development and roads) while only 0.3 percent of the town contains areas of undisturbed wetlands. A total of approximately 28 percent of the town was found to be developed.

In Deerfield, approximately 72.4 percent or a majority of the town contains undisturbed upland forests (with some scattered residential development and roads) while only 4.5 percent of the town contains areas of undisturbed wetlands. A total of 23.1 percent of the town was found to be developed.

Following completion of the inventory and mapping results, step two of the project consisted of a thorough analysis of both towns' existing land use regulations primarily focusing on setbacks, buffers and wetlands. This analysis was conducted by the SNHPC with assistance provided by the 2006 New Hampshire Estuaries Project, Candia and Deerfield Advisory/Technical Committee. Over the course of a year and a total of ten meetings, three major shoreland protection options were identified and evaluated by

the Committee. The preferred option selected by the Committee was based on its effectiveness, and ease of use as a standard in both towns.

The preferred option recommended by the Committee consisted of improving the town's existing regulations and educating town officials and town board's about the State's Comprehensive Shoreland Protection Act (CSPA) requirements and how/where these requirements apply within each town.

In developing the recommended model ordinance, the Committee considered many of the recommendations presented in the Final Report of the Commission to Review the Effectiveness of the Comprehensive Shoreland Protection Act compiled by the NH DES, Wetlands Bureau, dated November 30, 2006.

List of Tables

No tables were created for this report.

List of Figures and Maps

Figure 1: Deerfield Zoning, Section 210.7 A,E

Figure 2: Deerfield Zoning, Section 210.7 B

Figure 3: Deerfield Zoning, General Provisions, Section 305

Figure 4: Candia Buffer Provisions, Section 10.06

Figure 5: Candia Buffer Provisions, Section 10.06

Figure 6: Candia Buffer Provisions, Section 10.06

Figure 7: Candia Zoning Ordinance, Section 4.03

Figure 8: Proposed Combined Shoreland Protection Ordinance

Map #1 delineates the Hydrological Features in the Town of Candia, including stream order ranking, watershed boundaries, Great Ponds and other surface water bodies.

Map #2 delineates the Hydrological Features in the Town of Deerfield, including stream order ranking, watershed boundaries, Great Ponds and other surface water bodies.

Map #3 delineates the undisturbed/intact wetland buffers and upland forests in the Town of Candia.

Map #4 delineates the undisturbed/intact wetland buffers and upland forests in the Town of Deerfield.

Map #5 shows the 2005 High Resolution Orthophotos utilized for the buffer delineation in the Town of Candia.

Map #6 shows the 2005 High Resolution Orthophotos utilized for the buffer delineation in the Town of Deerfield.

Other Maps Included:

Riparian Buffers Map, Town of Candia, New Hampshire - displays rivers, streams and Great Ponds under jurisdiction of the Recommended Model Ordinance.

Riparian Buffers Map, Town of Deerfield, New Hampshire – displays the rivers, streams and Great Ponds under jurisdiction of the Recommended Model Ordinance.

Introduction

Undisturbed vegetated areas serve an extremely important function within the natural ecosystem, particularly regarding water quality. When rainfall or surface water runoff percolates through undisturbed natural and vegetated areas prior to reaching a stream or other body of water, both particulate and chemical filtration occurs. These functions cannot occur when filtration is prevented due to development that creates impervious surfaces. The natural and vegetated areas found adjacent to shorelands along streams, rivers, ponds and great ponds are commonly referred to as riparian buffers. These natural buffers are extremely important to the proper function of the hydrologic cycle, which helps to maintain a clean water supply. Protecting these areas through land use regulations is one way that the impacts of development can be mitigated and the water quality of the adjacent water body can be protected.

The first step in protection, however, is to conduct an inventory to determine where development exists within the watersheds and how water flows across the land. This will give insight into what land protection measures are needed and where runoff enters the stream system. It also provides an indication of the location and amount of the natural undisturbed buffers which remain within the community.

Project Goals and Objectives

The primary goal of this project is to facilitate an educational outreach program designed specifically to implement a uniform set of land use regulations to protect the remaining undisturbed natural riparian buffers along the Lamprey and North Branch Rivers (2nd order and higher streams) and other surface waters in both the towns of Candia and Deerfield, New Hampshire. In accomplishing this goal, the two towns worked closely together to develop a single model ordinance through an Advisory/Technical Committee made up of members of the town planning boards and conservation commissions and other town residents. The objective of the Advisory/Technical Committee was to develop a consistent model approach that could be adopted and applied in both towns.

The first step of the project was to delineate and map the current natural undisturbed buffers – wetlands and upland forest areas adjacent to the 2nd order and higher streams and great ponds in both towns. No distinction was made in buffer width or the type of wetlands and upland forest buffers that exist in both towns. The focus of this inventory was primarily on identifying all the remaining undisturbed buffers that are within the flow path of the water that fills these streams and lakes. This was done in order to better understand where these buffers currently exist and if these natural areas are currently being protected or not, and if so, what sort of protection exists or does not exist. The second step of the project involved an investigation of opportunities for instituting changes in the towns land use regulations and, to create consistent and easy to implement land use regulations that can be adopted to protect these areas in both communities.

The final step of the project will be to hold educational workshops in January 2007 with the planning boards in both towns with the goal of developing specific zoning ordinance amendments for consideration and adoption at the March 2008 Town Meeting. In developing these zoning amendments, the recommended draft model ordinance will be

tested on actual development proposals under consideration and review by each planning board. This will allow the planning boards to better understand the proposed regulations and to see first hand how the regulations would impact the proposed development as well as protect the adjacent riparian buffers.

In addition, as part of the public outreach component of this project, a grant was written to the New Hampshire State Conservation Committee Mooseplate Program to fund the design and installation of signs within the public right of way and protected shoreland areas in both communities to identify and raise public awareness of these protected water bodies. Grant awards will be announced in the spring of 2007. A copy of the proposed draft sign containing the Estuaries Project Logo is included in the Appendix of this report.

Activities and Methods

The methodology used to delineate the undisturbed natural buffers and to create the inventory maps for this project was the same for both Candia and Deerfield. The first task was to create a basic hydrological features map identifying the watershed boundaries, HUC levels, rivers, streams, stream order ranking, and great ponds in each town (see following Maps #1 and #2). This was accomplished utilizing GRANIT data, NH DES data, and input provided by the Technical/Advisory Committee. The final stream order ranking developed for each map is consistent with the NH DES stream order protocol and the Intact Buffers Characterization Study performed by GRANIT.

Upon completion of the hydrological features map of each town, the Technical/Advisory Committee was asked to identify the stream order ranking and surface water bodies to be included in the inventory. The main issue was whether to inventory all the headwater or 1st order tributaries and higher streams or to inventory only the 2nd order and higher streams. Because of the large number of 1st order tributaries and streams existing in both towns, the Committee recommended only the 2nd order and higher streams be included in the study.

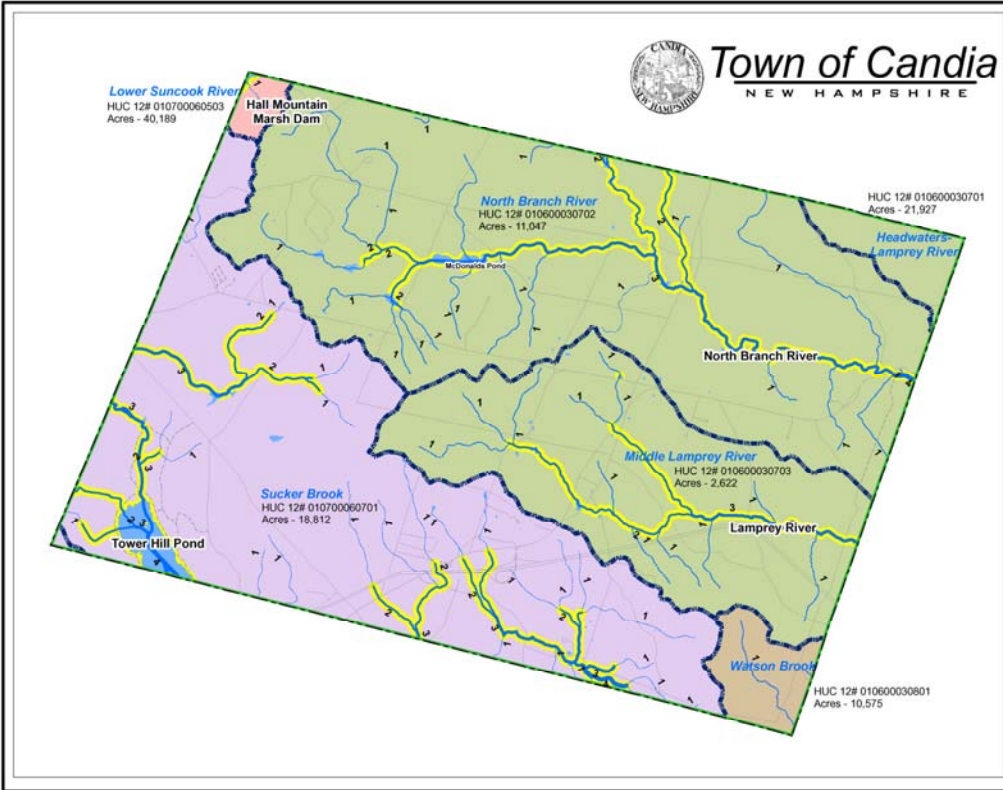
Once this decision was made, the second task involved creating a GIS base map. This was accomplished by stitching together the most up to date digital orthophotos available for each town. The New Hampshire Department of Transportation (NH DOT) 2005 digital orthophotos were used to create the base map because of their availability and accuracy. A copy of the orthophoto base map for each town is included within the Appendix of this report. Upon creation of the digital base maps, GRANIT hydrologic and hydric soils GIS data layers were then added to the maps as well as an overall road layer sourced from the NH DOT. In addition, Coarse Filter GIS data from NH Fish and Game's Significant Wildlife Habitat shape files were then applied to each map (NH Fish and Game's fine filter wildlife habitat GIS data was not available at the time).



Town of Candia NEW HAMPSHIRE

Map #1

Hydrological Features

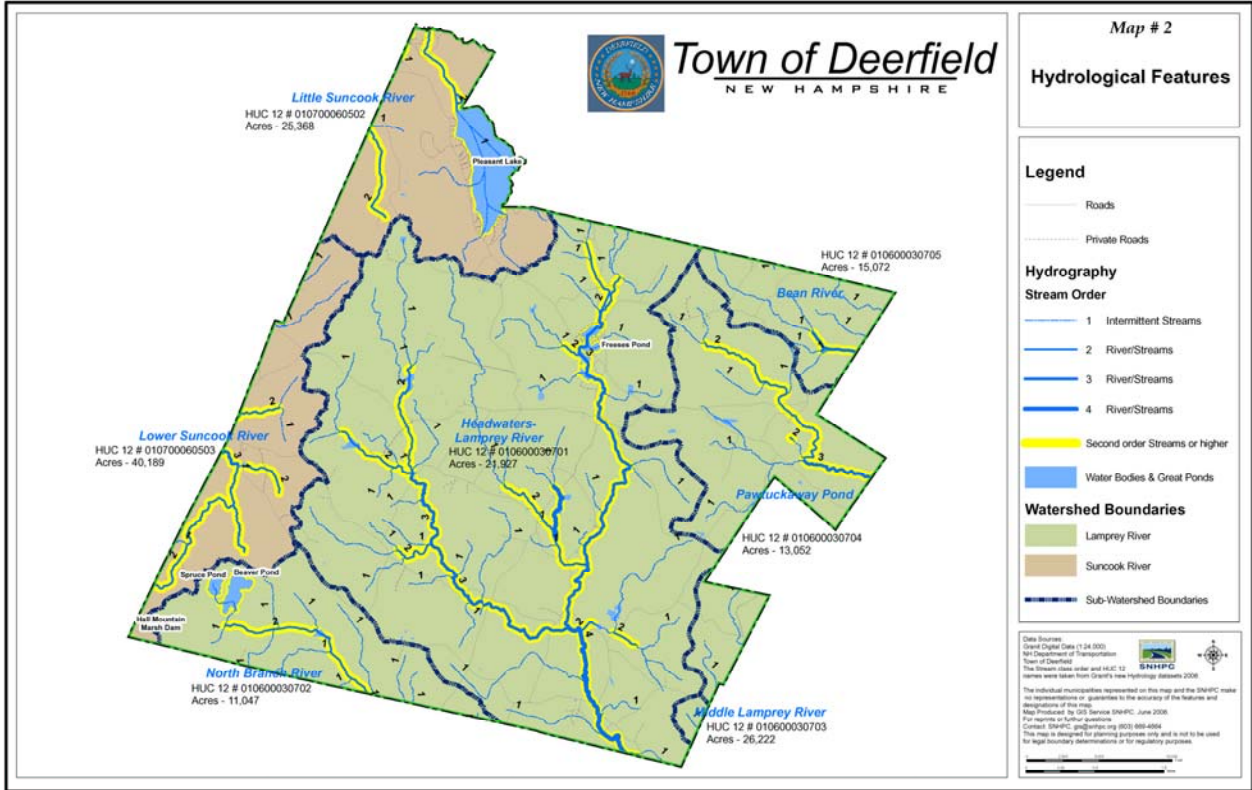


Legend

- Roads
- - - Private Roads
- Hydrography**
- Stream Order**
- 1 Intermittent Streams
- 2 River/Streams
- 3 River/Streams
- 4 River/Streams
- Yellow Second order Streams or higher
- Blue Water Bodies & Great Ponds
- Watershed Boundaries**
- Purple Cohas Brook
- Tan Exeter River
- Green Lamprey River
- Pink Suncook River
- Blue Sub-Watershed Boundaries

Data Sources:
 OpenStreetMap (2014-2015)
 NH Department of Transportation
 Town of Candia
 The stream class order and HUC12 names were taken from Grant's new hydrology datasets 2008.

The individual municipalities represented on this map and the SH-4PC make no representation or guarantee to the accuracy of the features and designations of this map.
 Map Produced by GIS Service SH-4PC, June 2008.
 For repairs or further questions:
 Contact: sh4pc@planning.nh.gov (603) 888-4804
 This map is designed for planning purposes only and is not to be used for legal boundary determinations or for regulatory purposes.



In applying this data to the base maps, NH Fish and Game's wildlife layers were aggregated into the following three classes:

1. Disturbed: 110, 140, 211, 212, 710, 790
2. Upland Forest: 412, 414, 419, 421, 422, 423, 424, 430
3. Wetland: 500, 610, 620

Next, new polygon shape files were created for the wetland areas adjacent to all the 2nd order streams and greater and great ponds. These files were generated to create a refined shape file that identifies all the undisturbed wetlands immediately adjacent to either 2nd order or greater streams or great ponds. The goal was to create polygons that display undisturbed wetlands and shoreland. To determine the size of these areas, polygons were drawn to enclose the Hydric A soils and wetlands as delineated in the coarse filter data layer from the Fish and Wildlife shape file and were visually compared against the 2005 orthophotos and adjusted where appropriate. The stream and water body itself was excluded from these polygons. The boundaries to the buffers are drawn at the extents of the above mentioned delineations or where they are broken by any type of development shown by road layers, the developed regions as defined by the coarse filter layer from the Fish and Wildlife shape file, or identified as developed from a visual interpretation of the orthophoto images.

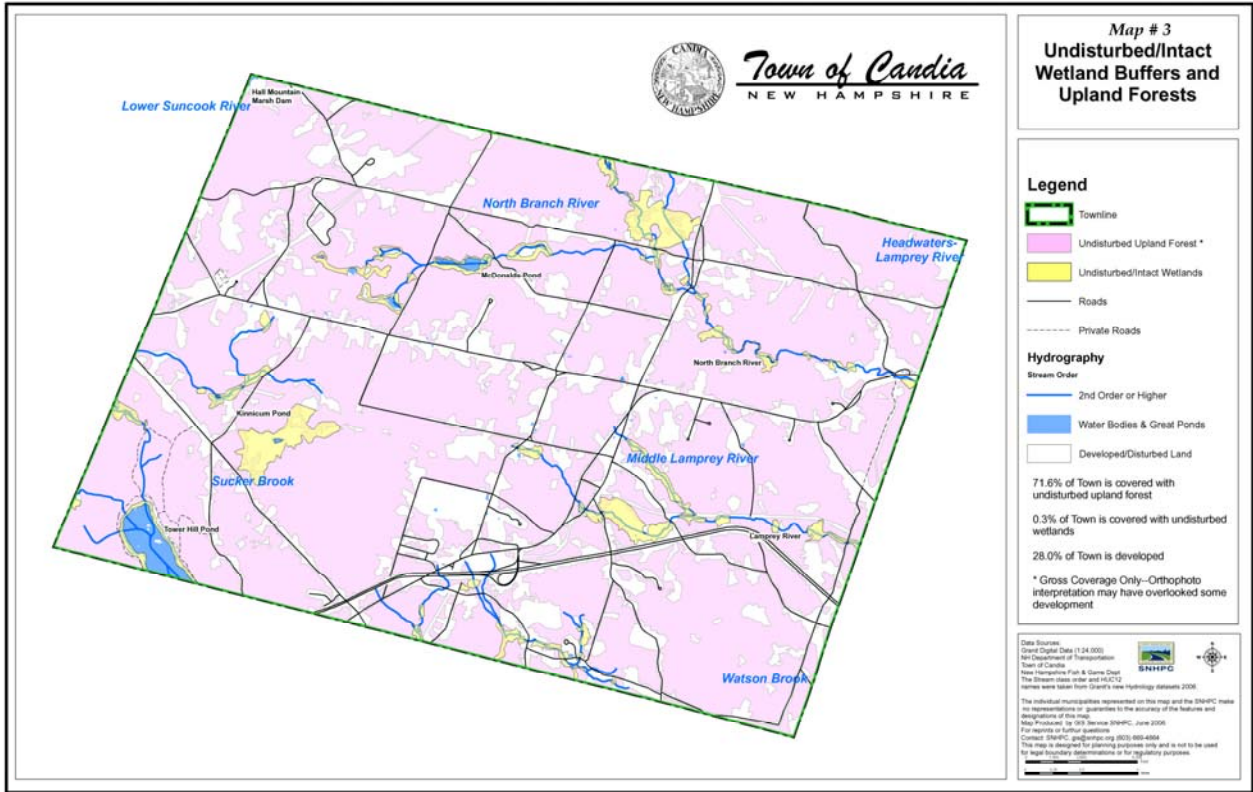
Lastly, new polygon shape files were created for the upland forests. These files were generated to create a refined shape file that will hold undisturbed forested areas in the towns. To determine these areas, polygons from the Upland Forest Aggregate class of the Fish and Game's shape file were merged then reconciled against the 2005 orthophotos and adjusted where appropriate by subtracting any areas that are developed.

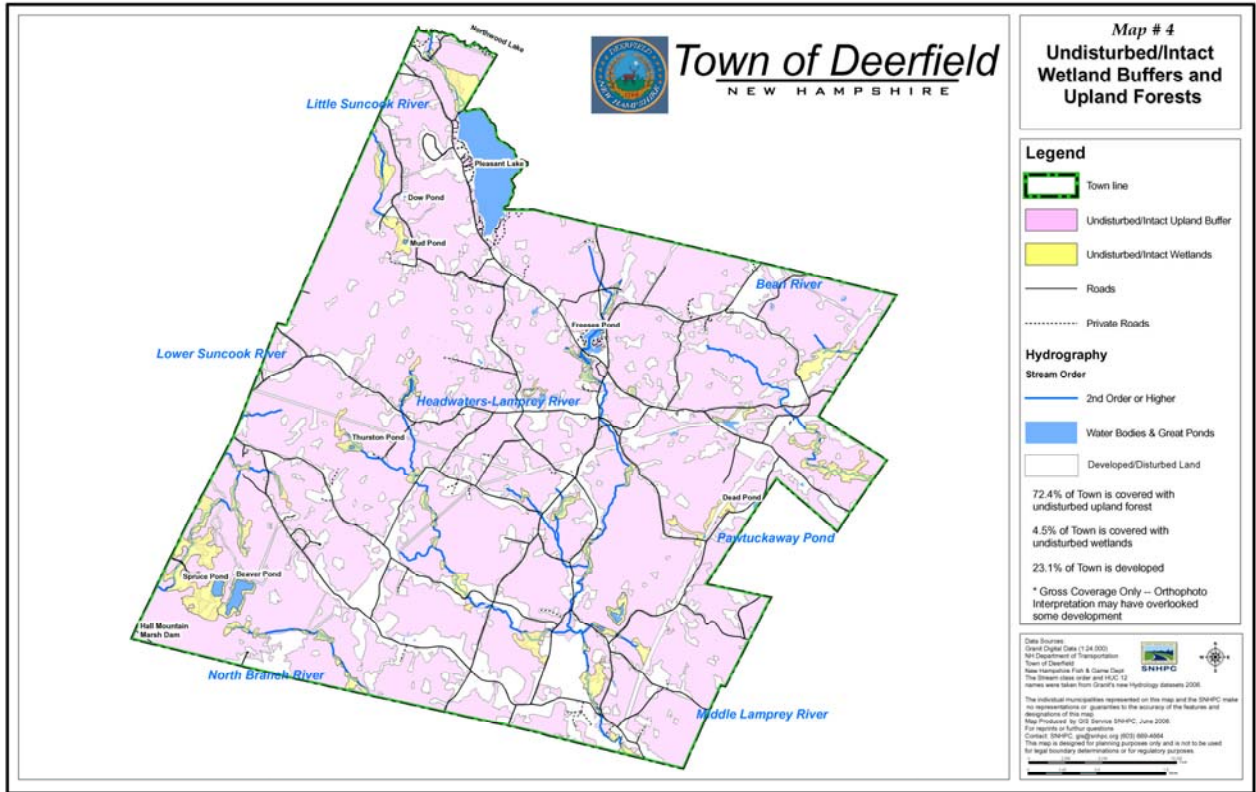
The inventory maps (see following maps 3# and map 4#) were then reviewed by the Advisory/Technical Committee to assess the amount and coverage of the remaining undisturbed natural buffers in both communities. The inventory maps were also used in conjunction with the town's existing setback and wetland zoning ordinances to determine what the best option would be for a uniform and combined shoreland protection approach.

Inventory Results

In delineating and mapping the natural undisturbed vegetative buffers in both towns, no attempt was made in establishing an abstract buffer width along any of the 2nd order or higher streams or identifying the type of wetland or upland forest that currently exists. The primary focus of the inventory was to identify the remaining undisturbed natural vegetated areas both wetland and upland forest no matter how wide or how long these natural areas may be provided these areas are located within the flow path of the water draining to the adjoining streams and lakes.

Examination of the results of the inventory of the identified undisturbed wetlands and upland forests in each town revealed a number of similarities. First, the total amount of river lengths – 138,292 feet in Candia and 188,839 feet in Deerfield consisting of 2nd





order or higher streams was similar. Second, the total amount of undisturbed wetland buffering found directly adjacent to the water's edge – 36.9 percent in Candia and 43 percent in Deerfield was similar.

The identified undisturbed wetland buffers in both towns are typically narrow areas located in close proximity to both sides of the streams. Development in both towns has mostly occurred outside these areas with the exception of residential development along the shorelines of some of the lakes and Great Ponds. This is particularly prevalent around Pleasant Lake in Deerfield.

The upland forest regions on the other hand exist mainly as large tracts of undisturbed land that have been fragmented by roads, trails, and power lines. Often, the upland forest appears to exist up to the edge of streams with no wetland buffering and sometimes in conjunction with wetland buffering.

The inventory results indicate that 47.2 percent of the 2nd order and higher rivers and streams in Candia have some sort of natural upland forest buffering within the watershed surrounding the water body.

While in Deerfield, 61.8 percent of the 2nd order and higher rivers and streams have some sort of natural upland forest buffering within the watershed surrounding the water body.

From a town wide perspective, approximately 71.6 percent or a majority of the land area of the Town of Candia consists of undisturbed upland forests (with some scattered residential development, roads and utilities) while only 0.3 percent of the town contains areas of undisturbed wetlands. Approximately 28 percent of the town was found to be developed.

In Deerfield, approximately 72.4 percent or a majority of the land area of the town consists of undisturbed upland forests (with some scattered residential development, roads and utilities) while only 4.5 percent of the town contains areas of undisturbed wetlands. Approximately 23.1 percent of the town was found to be developed.

Evaluation of Existing Town Regulations

A summary of the evaluation of the town's existing zoning regulations is provided below.

The Town of Deerfield's existing regulations are found under the Wetlands Conservation District Ordinance (Section 210) and Article III General Provisions, Section 305 Setback from Water Bodies.

The Town of Candia's existing regulations are found under the Wetlands Protection Ordinance (Article X) as well as Section 4.03, Zoning Districts.

Town of Deerfield

The Town of Deerfield's Wetlands Conservation District Ordinance (Section 210.7 A. and E.) was recently amended at the 2006 Town Meeting. The ordinance requires that no building shall be erected and no septic tank or leach field may be constructed or enlarged within 100 feet of any wetland (see Figure 1). In addition, under Section 210.7 B., no part of areas designated as having very poorly drained soils, or bodies of water, may be used to satisfy the minimum lot size (see Figure 2).

In addition, Article III, General Provisions, Section 305 Setback from Water Bodies requires that no building permit will be issued for any structure having a setback of less than 75 feet from any *river or stream, lake or pond* (see Figure 3). A structure is defined in the town's zoning ordinance as anything constructed or erected with a fixed location on the ground, or attached to something having a fixed location on the ground and it excludes minor installations such as fences, mailboxes, flag poles, portable screen houses and the like. A structure also includes a septic system and leach field as it is fixed on the ground and connected to a structure.

It is important to note that there are two differing setback standards 100 foot and 75 foot within the town's existing regulations – one for wetlands and one for any river or stream, lake or pond. It is recommended that this inconsistency be addressed as part of the model regulations developed as part of this project.

Figure 1: Deerfield Zoning, Section 210.7 A,E

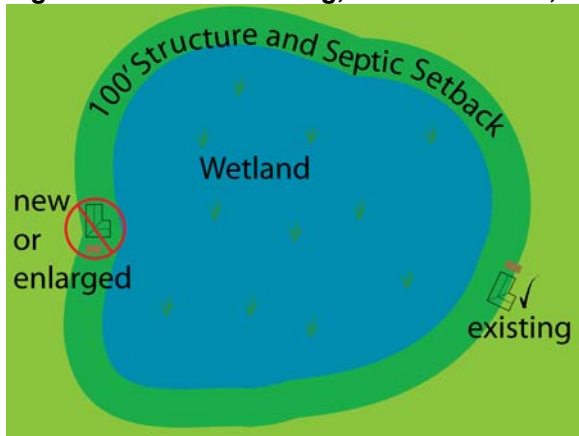


Figure 2: Deerfield Zoning, Section 210.7 B

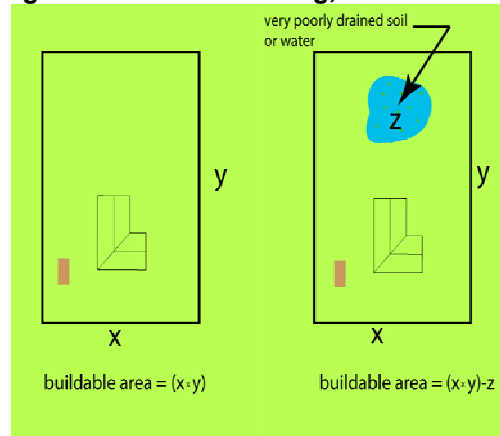
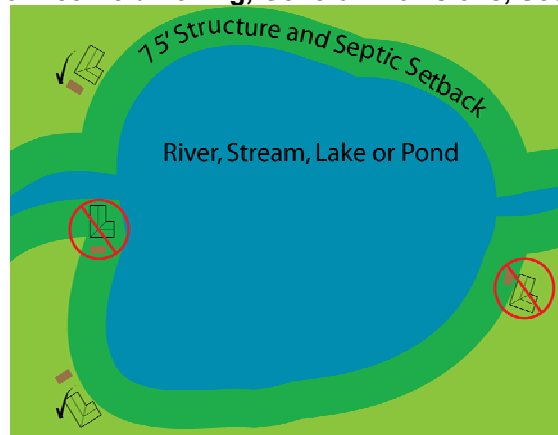


Figure 3: Deerfield Zoning, General Provisions, Section 305



In addition to Deerfield’s existing regulations, the State’s Comprehensive Shoreland Protection Act (CSPA) currently applies to approximately 17,096 feet along the shoreline of the Lamprey River which is considered a 4th order stream under the State’s stream ranking protocol. The length of the river subject to these regulations is identified on Map #4 Hydrological Features. These regulations currently require a 150 foot wide natural woodland buffer along both sides of the river.

There are also five Great Ponds located in the Town of Deerfield, which are currently subject to the State Shoreland Protection Act. These ponds are identified below and on Map #4:

- Beaver Pond – 58.4 acres
- Freeses Pond – 82 acres
- Hall Mountain Marsh Dam – 23 acres (Mostly in Hooksett)
- Pleasant Lake – 493.5 acres
- Spruce Pond – 21.7 acres

In review of Deerfield’s existing regulations, it is clear that besides the CSPA, there are currently no land use regulations that specifically address the protection of existing vegetated buffers along these water bodies. In addition, the town’s existing setback regulations are not consistent with respect to wetlands, rivers, streams, lakes and ponds.

Town of Candia

The Town of Candia’s Wetlands Protection Ordinance (Section 10.06: Buffer Provisions) currently prohibits septic systems, leach fields or other waste disposal facilities to be installed within 75 feet of the edge of any wetland (see Figure 4 below). The ordinance also requires that all construction, forestry and agriculture activities within 100 feet of any wetland shall be undertaken with special care to avoid erosion and siltation into the wetlands.

In addition, the Planning Board, pursuant to its site plan review authority, may require an erosion control plan approved by the Rockingham County Conservation District for any project undertaken up-grade of a wetland. No building activity (building does not include septic systems) shall be permitted within 100 feet of *any pond, flowing stream or very poorly drained soil* (see Figure 5 below) and within 50 feet of any poorly drained soil (see Figure 6 below) except where an existing building within the buffer zone is destroyed or is in need of extensive repair, it may be rebuilt provided that such rebuilding is completed within two years of the event causing destruction and the new or rebuilt structure shall not extend further into the wetlands or buffer area than the original structure.

Figure 4: Candia Buffer Provisions, Section 10.06

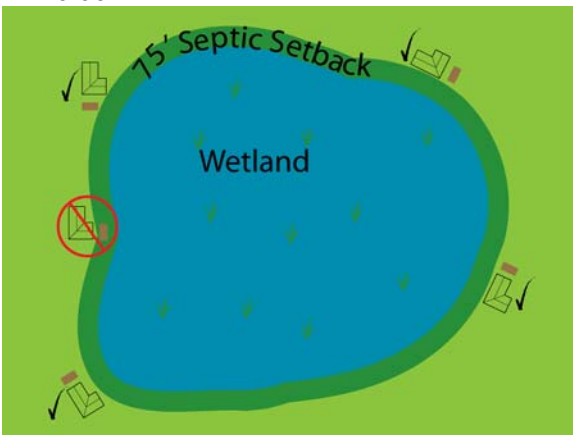


Figure 5: Candia Buffer Provisions, Section 10.06

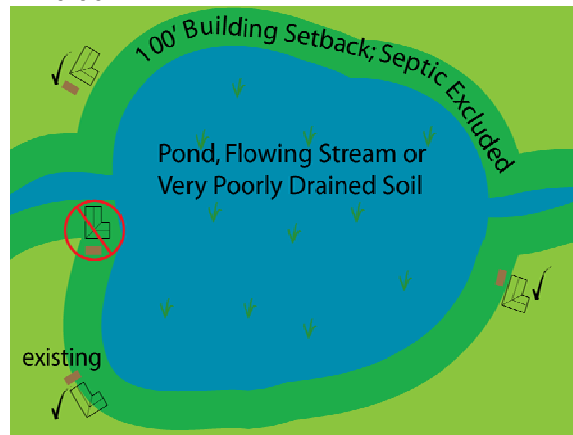
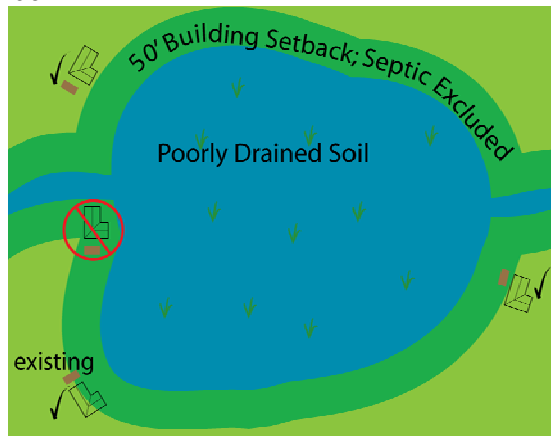


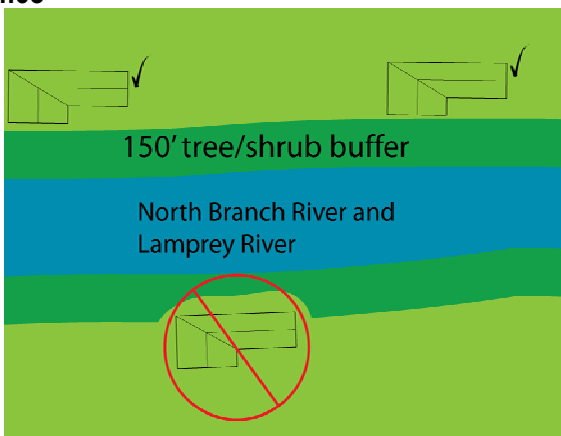
Figure 6: Candia Buffer Provisions, Section 10.06



It is important to note that there is an inconsistency in the town's existing regulations. While the zoning ordinance clearly prohibits septic systems, leach fields and other waste disposal facilities within 75 feet of the edge of any wetland, it does not exclude septic systems, leach fields and other waste disposal facilities within the 100 foot building setback of any *pond, flowing stream or very poorly drained soil* or within the 50 foot building setback of any *poorly drained soil*. It is strongly recommended that this inconsistency be addressed as part of the model regulations developed as part of this project.

In addition to these standards, the Town of Candia Zoning Ordinance (Section 4.03: Zoning Districts) was recently amended at the 2006 Town Meeting to require that a vegetative buffer of trees and shrubs 150 feet wide be maintained on any property within the Town's Commercial District and Light Industrial District to protect the south side of the adjacent North Branch Lamprey River (see Figure 7 below). The boundary of this vegetative buffer is shown on the Town's official Zoning Map.

Figure 7: Candia Zoning Ordinance, Section 4.03



In addition to the town's existing regulations, the State's Comprehensive Shoreland Protection Act (CSPA) currently applies to approximately 4,171 feet along the shoreline of the North Branch Lamprey River, which is considered a 4th order stream under the State's stream ranking protocol. The length of the river subject to these regulations is identified on Map #3 Hydrological Features. These regulations require a 150 foot wide natural woodland buffer from the reference line (natural mean high water level) on both sides of the river.

There are also three Great Ponds located in the Town of Candia, which are currently subject to the State Shoreland Protection Act. These ponds are identified below and are also shown on Map #3:

Hall Mountain Marsh Dam – 3 acres (Mostly in Hooksett)
Tower Hill Pond – 157 acres
McDonalds Pond – 30 acres

Progress in 2006

As noted in the review of both towns' existing regulations above, in March 2006, the Town of Deerfield increased its wetland building setback from 75 feet to 100 feet and the Town of Candia required that a vegetative buffer of trees and shrubs be maintained with 150 feet of the south side of the North Branch Lamprey River. While these actions are positive steps in the right direction, the town's new requirements are not designed to minimize shoreland disturbance or protect water quality. In addition, there are no standards or provisions in either of the town's existing zoning, subdivision or site plan regulations for preventing paving, the installation of parking lots, or the clear cutting of trees or natural vegetation adjacent to a stream, lake or pond, except as provided for under the State's CSPA. Further, there are inconsistent standards in both towns with respect to wetland and stream setback requirements and the placement of septic systems and leach fields adjacent to a stream, lake or pond, which is not subject to the State's CSPA.

While the town's existing zoning regulations were adopted in the spirit of accommodating reasonable development within riparian areas, no measures are incorporated into the ordinances to reduce or intercept surface water runoff, wastewater, subsurface flow, and deeper groundwater flows from upland sources. In addition, no measures are in place to remove or minimize the effects of nutrients, sediment, organic matter, pesticides, and other pollutants, and to moderate the temperature of the water bodies. In short, the town's existing regulations fall short in protecting the community's existing natural riparian buffers.

Actions Needed to Strengthen the Town's Existing Regulations

To address these weaknesses, it is clear that the natural conditions, soils and vegetation found along the shorelands of the town's 2nd order and higher streams and Great Ponds need further protection and that riparian buffer standards are needed.

In developing new standards, the Advisory/Technical Committee identified three possible shoreland protection approaches. These options are highlighted in more detail below. Option A relies on the town's existing regulations with education to increase awareness of the CSPA. Option B strengthens the town's existing regulations by focusing on buffer protection standards including education to increase awareness of the CSPA. Option C maintains the town's existing setback regulations, but expands coverage and jurisdiction of the CSPA to include 2nd and/or 3rd order streams and rivers in both towns, including Great Ponds and other water bodies such as smaller lakes and ponds.

Possible Shoreland Protection Approaches

The following shoreland protection approaches are designed to supplement and/or improve Candia and Deerfield's existing regulations.

Option A: Continue to Rely on Existing Regulations and Educate Town Officials and Town Board's About the State Shoreland Protection Act Requirements and How/Where These Requirements Apply Within Each Town

Planning Boards, Town Officials, Building Inspectors and Town Planners are often not aware of the Comprehensive State Shoreland Protection Act (RSA Chapter 483-B) and how these shoreland protection requirements may apply within their community. While it is the responsibility of the Commissioner of NH DES (with the advice and assistance of the Office of Energy and Planning, Department of Resources and Economic Development and Department of Agriculture, Markets and Food) to enforce the Act, local government officials and planning boards need to be made of aware of the State's requirements as they review various land development applications and permits that come before them.

Option A would involve scheduling and facilitating a mandatory shoreland protection informational workshop for all town officials and board members to attend. In lieu of a mandatory meeting, SNHPC and NH DES could present an overview of the CSPA to appropriate public officials and boards at their regular meetings. These would include the Board of Selectmen, Planning Board, Conservation Commission, and the Zoning Board of Adjustment. In addition, an informational guidebook could be prepared and distributed as an educational tool.

If as a result of this education, each town wished to work more closely with the state in implementing the CSPA, RSA 483-B:7 (specifically -- Reporting; On-Site Inspections; Local Participation) allows NH DES to devise a system whereby municipal officials (primarily the planning board coordinator or building inspector) may voluntarily assist with the permitting process under RSA 483-B:6 and the subsequent enforcement of permit conditions by performing certain reporting functions relative to on-site inspections. The use of these reports however is at the discretion of NH DES, but may,

when appropriate, eliminate the need for further on-site review by NH DES department staff.

Option B: Improve Existing Regulations and Educate Town Officials and Town Board's About the State Shoreland Protection Act Requirements and How/Where These Requirements Apply Within Each Town

Both the towns of Deerfield and Candia's existing setback regulations from water bodies (Deerfield – 75 feet and Candia 100 feet for structures and building activity) could be improved by including septic systems and leach fields within these setbacks and preventing the clear clearing of vegetation and trees adjacent to a water body. This could be accomplished several ways:

- (1) establishing within Deerfield's 75 foot and Candia's existing 100 foot setback to a water body use restrictions and a no cut and no mow buffer zone a minimum distance in width adjacent to the water body (which could include a 25 foot wide no mow/no cut riparian zone as measured from the mean high water line and a no mow/ cut vegetative zone 50 to 75 foot wide making up the balance of the setbacks – the width of these zones could also be set up proportionally based upon the amount of imperious coverage on the lot, i.e. buildings and paving). For example, if a parcel of land exceeds a 50 percent lot coverage, a more restrictive 50 foot wide no cut/no mow zone could be imposed; or
- (2) establishing a point system within the no mow/cut zones based upon tree size which would provide some measure of selected tree cutting down to the near-shore waters, but not clear cutting or mowing to the water's edge. This could be modeled similar to the Town of Moultonborough's zoning ordinance which utilizes this approach (see copy of Moultonborough's ordinance in the appendix).

Another approach to consider is amending the town's existing setback requirements to a water body by establishing decreasing setback buffer widths based upon stream ranking. For example, a 75 or 100 foot buffer could be required for all 3rd order streams/rivers, a 50 foot buffer for all 2nd order streams/rivers, and a 25 foot buffer for all 1st order or headwater streams (which ecologically, are the most important) and within these setback buffer widths – specific or proportional no mow/no cut riparian and no mow/selective cut zones could be established based upon imperious lot coverage or soil conditions such as the existence of Hydric A or Hydric B soils. No cut or no mow would be restricted from Hydric A soils unless a wetland permit is granted and no mow/selected cutting would be allowed in Hydric B soils.

Currently, the Comprehensive Shoreland Protection Act (CSPA) prevents clear cutting and the removal of excessive vegetation and trees by permitting selective cutting within the Natural Woodland Buffer. This is addressed by prohibiting no more than 50 percent of the basal area of trees and no more than 50 percent of the total number of saplings within the buffer to be removed within a 20-year period. Dead, diseased, unsafe, or fallen trees, saplings, shrubs, or ground cover may be removed and are not included in calculating the percentage limitations.

This provision, however, has been difficult for many public officials and property owners to understand, calculate and enforce and the State's Shoreland Protection Study Commission is currently recommending that these standards be removed and replaced with a point system approach modeled after the Town of Moultonborough's zoning ordinance.

Option B would also involve the education component identified in Option A.

Option C: Educate Town Officials and Apply State Shoreland Protection Act to 2nd and 3rd Order Streams within both Towns, including other water bodies in addition to Great Ponds. No changes would be made to the town's existing water body setback regulations, except for septic tanks and leach fields.

RSA 483-B:8 Municipal Authority authorizes municipalities to adopt land use regulations relative to all protected shorelands within their community which are more stringent than the minimum standards contained in Chapter 483-B. RSA 483-B: 8 also encourages municipalities to adopt land use regulations for the shorelands of water bodies and water courses other than public waters. This also includes enforcing regulations by issuing cease and desist orders and by seeking injunctive relief or civil penalties as provided by RSA 483-B:18, III (a) and (b).

Instead of improving the town's existing regulations as described in Option B, Option C would involve preparing Warrant Articles to amend the town's zoning ordinances by applying the State Shoreland Protection Act (CSPA) requirements to either 3rd order streams/ponds or to both 2nd order and 3rd order streams/ponds (this decision will need to be made by the Advisory/Technical Committee). These Warrant Articles could also include other water bodies (other larger ponds in addition to Great Ponds) that the Advisory/Technical Committee identifies that need to be protected. The selection of the streams/ponds and ponds to protect under this approach should be made by utilizing the information generated by this study and by making an educated decision the CSPA will be sufficient in shoreland protection for both towns. Each stream/pond and other water bodies selected for protection will also need to be identified by map length and location in the zoning warrant articles. It should be noted here that the State Shoreland Protection Committee will be proposing changes to the CSPA in their November 2006 report to extend the jurisdiction of the Act to all 3rd order streams and ponds in all towns across the state. If this change is adopted by the legislature, no local zoning amendments would be needed, unless it is determined: (1) municipalities can not wait for the state legislature to act; or (2) it is determined that 2nd order streams/ponds in Candia and Deerfield as well as other ponds and water bodies need protection and the CSPA can adequately work.

The Comprehensive Shoreland Protection Act currently applies to 4th order river/streams only and all fresh water bodies listed in the official list of public waters published by the NH DES pursuant to RSA 271:20, II, whether they are great ponds or artificial impoundments. A copy of the Comprehensive Shoreland Protection Act (RSA483-B) is attached within the Appendix.

Under these requirements, where existing, a natural woodland buffer must be maintained within 150 feet of the reference line. A “natural woodland buffer” means a forested area consisting of various species of trees, saplings, shrubs, and ground covers in any combination and at any stage of growth. For natural fresh water bodies without artificial impoundments, the reference line is the natural mean high water level as determined by NH DES.

Within the natural woodland buffer, the following prohibitions and limitations shall apply:

- A. Not more than a maximum of 50 percent of the basal area of trees, and a maximum of 50 percent of the total number of saplings shall be removed for any purpose in a 20-year period. A healthy, well-distributed stand of trees, saplings, shrubs, ground cover, and their living, undamaged root systems shall be left in place.
- B. Any person applying to NH DES for a septic system construction approval or alteration of terrain permit pursuant to RSA 485-A, or an excavating and dredging permit pursuant to RSA 482-A, within the protected shoreland shall include photographic documentation of the natural woodland buffer.
- C. Structures, as defined by RSA 483-B:4, XXII, within the natural woodland buffer shall be afforded an opening for building construction that shall be excluded when computing the percentage limitations under subparagraph (a)(2)(A).
- D. Dead, diseased, unsafe, or fallen trees, samplings, shrubs, or ground cover may be removed. Their removal shall not be used in computing the percentage limitations under subparagraph (a) (2) (A).
- E. Stumps and their root systems, which are located within 50 feet of the reference line, shall be left intake in the ground, unless removal is specifically approved by NH DES under RSA 482-A.
- F. Preservation of dead and living trees that provide dens and nesting places for wildlife are encouraged.
- G. Planting efforts that are beneficial to wildlife are encouraged.

Results (or Outcomes) and Discussion

In their review of the three protection options as described above, the Technical/ Advisory Committee indicated that an education only approach (Option A) would not provide adequately protection, nor would it satisfy the desire to develop a uniform regulation for the two towns. In addition, Option C, which is essentially an expansion of the State Shoreland Protection Act, was not recommended because it also did not meet the needs of both towns. As a result, Option B was selected as the preferred approach as it offers the opportunity to develop a more consistent ordinance for both communities.

In evaluating Option B further, the following proposals were generated and discussed by the Committee.

Option B Approaches to Improve Town Regulations:

B1 Make Both Town Ordinances the Same with Graduated Restrictions

- 100 foot building setback – applies to primary buildings and septic systems
- Establish minimum No Cut/Not Mow Buffer Zone – 25 ft. adjacent to water's edge: mean high water line
- Allow for selective cutting within balance of setback

B2 Same As Above, But Width of No Cut/No Mow Buffer Zone Based On Amount of Impervious Lot Coverage

- Lot Coverage > 50% - No Cut/No Mow Buffer Zone = 50 ft.
- Lot Coverage 25 – 50% - Buffer Zone = 25 ft.
- Lot Coverage < 25% - Buffer Zone = 15 ft

B3 Develop A Point System for Selective Cutting Within Buffer

- Within 100 ft. of mean high water line – no more than 50% of trees and saplings can be removed in any 25 ft. x 25 ft. section in a 20 yr period and in addition a minimum number of trees equal to 12 points according to the following rating system must be maintained:

<u>Diameter of Tree at 4 1/2 inches above ground</u>	<u>Points</u>
4 to 6 inches	1
6 to 12 inches	2
> 12 inches	4

No trees to be removed in any such 25 x 25 ft. section if the cumulative points of trees are less than 12.

Dead, diseased, unsafe or fallen trees and saplings may be removed.

B4 Establish Decreasing Setback Buffer Widths Based on Stream Ranking

- 100 ft. Buffer – all 3rd order streams/rivers
- 50 ft. Buffer – all 2nd order streams/rivers
- 25 ft. Buffer – all 1st order streams/creeks

Additional Options – Possible Descriptive Ordinance Language Considered:

Natural Woodland or Vegetative Buffer

Where existing, a natural woodland or vegetative buffer shall be maintained within 100 feet of any pond, flowing stream or wetland. A natural woodland or vegetative buffer means a forested or vegetated area consisting of various species of indigenous trees, saplings, shrubs, and ground covers in any combination and at any stage of growth. For the purposes of this ordinance, “maintained” shall mean the avoidance of clear cutting or complete removal or replacement with a lawn; however, clearing of some undergrowth, limited non-lethal limbing to clear a view, the creation of paths to the water, the replacement of some shrubs with other native species of groundcover, and the removal of diseased or dangerously damaged trees shall be permitted so long as such actions preserve the natural root systems of the trees and an understory vegetated by native species of shrubs and groundcovers.

Naturally Vegetated Buffer Strip

A naturally vegetated buffer strip meeting the requirements of the State Shoreland Protection Act shall be maintained from the reference line of each wetland, bog, marsh, vernal pool, perennial stream, flowing creek, river and lake as defined in this ordinance. No soil disturbance, no new structure, no new private road, lane, driveway, or impervious surface (eg. Sidewalk, tennis or basketball court) shall occur within 100 feet of the reference line, including the placement of septic tanks, leach fields, or the piping or associated appurtenances thereof. Existing lawns within the upland buffer may be allowed to remain provided that a minimum twenty-five (25) foot wide buffer strip adjacent to the reference line of the wetland or water body is not mowed and is allowed to reestablish naturally occurring vegetation. The application of fertilizers, pesticides, or herbicides within the buffer strip shall be prohibited except in conjunction with allowed agricultural activities. No clear cutting of vegetation or trees or the planting of grass may occur at any time within the 75 foot wide naturally vegetated buffer strip.

While the Technical/Advisory Committee was reviewing the possible buffer standards as identified under Option B above, the Final Report of the Commission to Review the Effectiveness of the Comprehensive Shoreland Protection Act, dated November 30, 2006 was released. This report contains a woodland buffer proposal that was attractive to the Advisory/Technical Committee. It also offered a methodology that utilizes graduated restrictions considering impervious coverage limitations based on increasing distance from the reference line (the high water mark). Although the report recommends that a point scoring system be utilized to address managed tree cutting within the buffer, the Committee realized that this approach similar to the basal calculations would continue to be difficult to administer or implement. Instead, the Committee agreed on the graduated restrictions approach which has been modified and incorporated into the following proposed model ordinance.

Proposed Model Ordinance

The following model ordinance was proposed by the Technical/Advisory Committee as the basis for future zoning amendments in both towns. A visual example of how the ordinance works is provided in Figure 8 as well as a copy of the Riparian Buffer Maps that would be inserted in both towns's zoning ordinance.

Buffer Standards from Water Bodies

Authority: As provided by RSA 483-B:8, Municipal Authority under the Comprehensive Shoreland Protection Act and RSA 674:16-17, Grant of Power and Purposes of Zoning Ordinances, the following buffer standards from water bodies are established.

Purpose and Intent: The purpose and intent of these standards are to:

- (1) protect and preserve the water quality of the town's major rivers, streams, lakes and ponds;
- (2) provide for the preservation of a natural vegetated buffer along said rivers, streams, lakes and ponds to act as a natural filter to capture sediment and pollutants from runoff;
- (3) stabilize stream banks;
- (4) increase property values by improving the appearance of the town's shorelines;
- (5) provide wildlife habitat; and,
- (6) shade the water to maintain a healthy temperature for aquatic life.

Application: These standards shall apply to all 2nd and higher order rivers and streams and Great Lakes as shown on the map designated as the "Town of Candia/Deerfield Riparian Buffer Map". This map is hereby deemed to be a part of the official Zoning Map of the Town of Candia/Deerfield and it may, from time to time be amended or updated.

Buffer Standards: A 150 foot wide buffer shall be maintained adjacent to the water's edge along the rivers, streams and Great Lakes as shown on the Town of Candia/Deerfield Riparian Buffer Map. The boundary of this buffer may vary based upon the curvature and slope of the land adjacent to the water's edge.

Within the 150 foot wide buffer, the first 50 feet adjacent to the water's edge shall remain in a natural and undisturbed state. No chemical applications; no sewage sludge, septage, or bio-solid applications; no excavation or mining of minerals; no logging, no clear cutting of trees, and no cutting of existing vegetation below 3 feet in height shall be permitted. Managed tree care, pruning and the removal of dead, diseased or dangerously damaged trees is permitted.

Within the area from 50 feet to 100 feet within the buffer: 50% of this land area must be left in a natural and undisturbed state. No sewage sludge, septage, or bio-solid applications; no excavation or mining of minerals; no mechanized logging; and no clear cutting of trees shall be permitted. Logging, agriculture and building activity is permitted subject to the setback requirements of this ordinance and applicable state and federal law, and the submittal to the Planning Board of a DES approved storm water control and drainage plan designed to prevent any increase in runoff to the adjacent surface water.

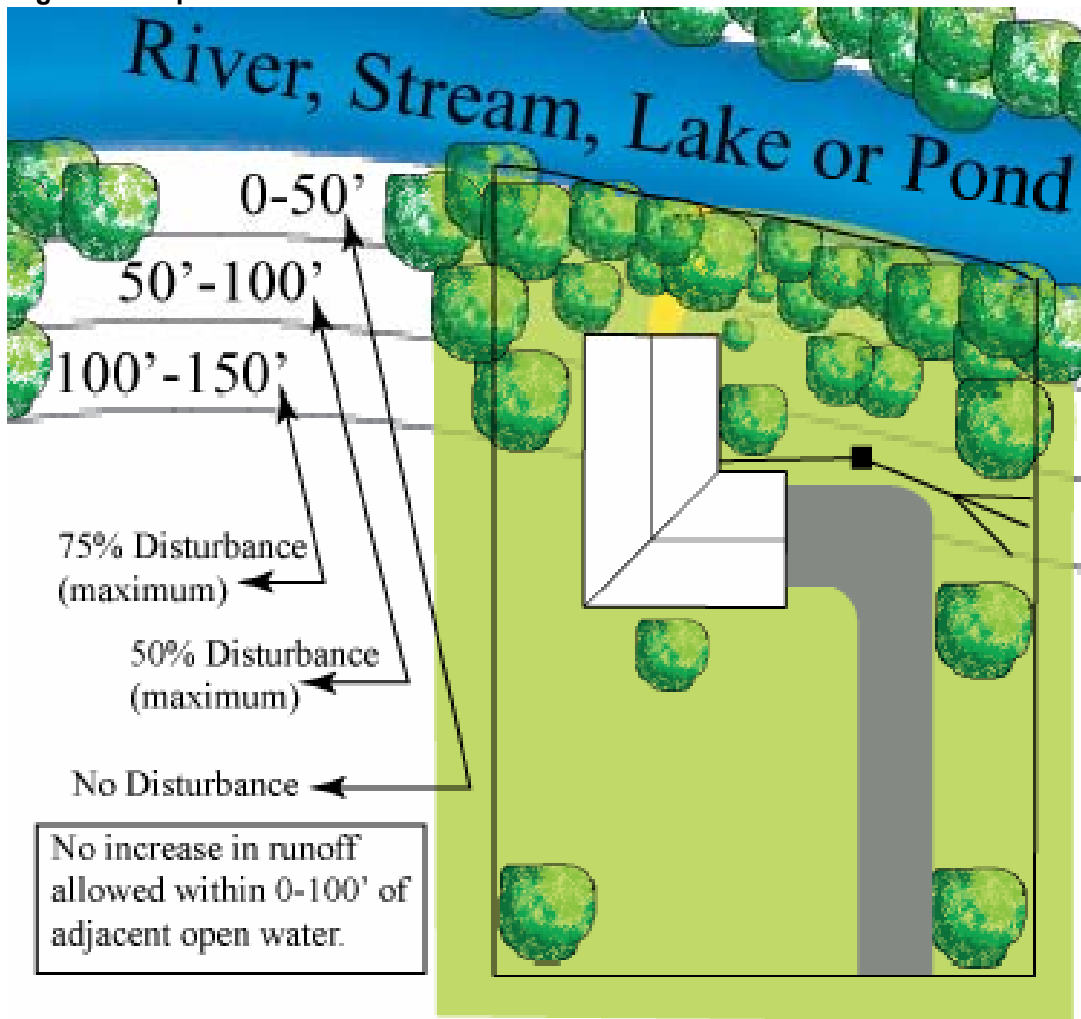
Within the area from 100 to 150 feet within the buffer: 25% of this land area must be left in a natural and undisturbed state. No sewage sludge, septage, or bio-solid applications; no clear cutting of trees; and no excavation or mining of minerals shall be permitted. Logging, agriculture and building activity, including the installation of septic tanks and leach fields are permitted subject to all applicable local, state and federal law.

Exemptions: The creation of foot path(s) to the water as well as the construction of sandy beaches along the shoreline of the water body is permitted within the 150 foot wide buffer provided the foot path(s) preserve the natural root system of the surrounding trees and natural vegetation, and a wetland permit for the construction of a sandy beach is obtained from the State Wetlands Bureau. Notwithstanding other provisions of the town's zoning ordinance, the construction of additions and their associated accessory buildings, and septic systems and any legally required replacements thereof shall be permitted within the 150 foot buffer provided that: (1) the building lawfully existed prior to the effective date of this ordinance; (2) no part of the footprint of the addition is any closer to the protected water body than was the existing structure; and, (3) the proposed construction conforms with all other applicable ordinances and regulations of the town.

Conflicting Provisions: Should any of the provisions of this ordinance conflict with any other applicable provision of Federal or State law, or local Land Use Ordinance or Regulation, the provision providing the greater protection of the protected water body shall apply.

Water's Edge: For the purpose of these standards, distances shall be measured as follows: for natural lakes and ponds, from the ordinary high water mark; for artificially impounded fresh water bodies, from full pool as measured from the elevation of the spillway crest; for streams and rivers, from the ordinary high water mark.

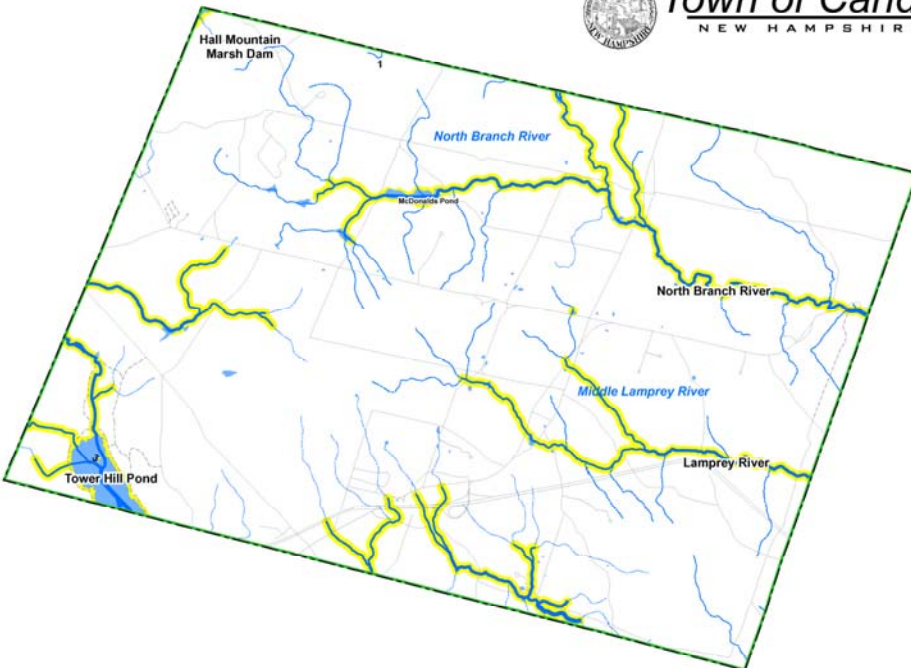
Figure 8: Proposed Combined Shoreland Protection Ordinance





Town of Candia NEW HAMPSHIRE

Riparian Buffers Map

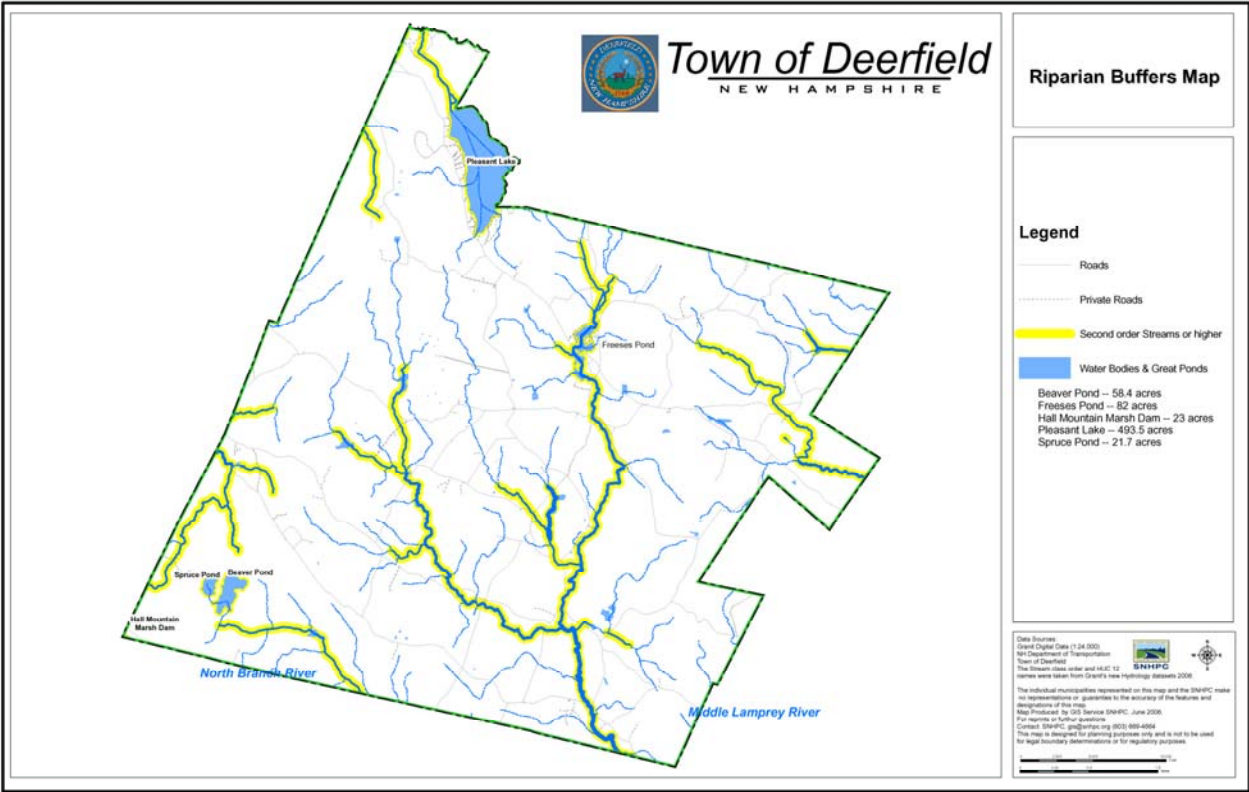


Legend

- Roads
 - Private Roads
 - Second order Streams or higher
 - Water Bodies & Great Ponds
- Hall Mountain Marsh Dam – 3 acres
 Tower Hill Pond – 157 acres
 McDonalds Pond – 30 acres

Data Source:
 Grand Digital Data (1/24/2005)
 NH Department of Transportation
 State of Candia
 The stream class order and HUCID names were taken from Candia's own hydrology datasets 2006

The individual municipalities represented on this map and the SNAPC make no representation or guarantee to the accuracy of the features and designations of this map.
 Map Produced by GIS Services SNAPC June 2006
 For repairs or further details
 Contact SNAPC: gis@snapc.org 603-658-4304
 This map is designed for planning purposes only and is not to be used for legal boundary administration or for regulatory purposes.



Conclusions

The natural, vegetated buffer that surrounds surface water bodies is one of the primary filters of nonpoint runoff. The tree canopy also shades and cools the water which is vital to aquatic life. Candia and Deerfield are experiencing increasing development pressures, especially around their Great Ponds and rivers. Former seasonal camps are increasingly becoming year round residences with newly enlarged homes on the same parcels of land. Increasing growth and development in both communities is causing a reduction in the effective buffering capacity of the communities remaining undisturbed wetlands and upland forests. This has increased awareness of the need to provide consistent and effective regulations that will help protect these buffers.

The recommended model ordinance developed by the Technical/Advisory Committee addresses these concerns. It protects the buffering capacity that undisturbed shoreland provide while also allowing landowners to utilize their property, thus helping to maintain its value for the landowner and the community at large.

Recommendations (for future work or management strategies)

Protecting natural resources is an iterative process that must take into account many, often opposing perspectives. The environment, future land uses, landowner rights, and public health must all be considered when making any recommendations. Good, balanced decisions can only be made when the interested parties are well informed. Thus public education and outreach are of utmost importance. Therefore a campaign to raise awareness of riparian buffers and their vital importance must be developed. The Mooseplate Program sign program is a good start, but more must be done.

Upon completion of the proposed model ordinance, a press release was released to all the newspapers within the region on January 31, 2007 notifying the public of the proposal and the upcoming workshops to be held with both boards (see copy of press release in the Appendix).

On January 24, 2007, SNHPC staff reviewed the results of this study and the proposed model ordinance with the Deerfield Planning Board. The board agreed to work with SNHPC to prepare the necessary warrant article for making revisions to the town's zoning ordinance. This warrant article will be scheduled for the March 2008 town meeting.

On February 7, 2007, SNHPC staff presented the results of this study and the proposed model ordinance to the Candia Planning Board. The board agreed to work with staff to prepare the necessary zoning amendment for the March 2008 town meeting.

As part of the development of these warrant articles, SNHPC staff will work with both planning board's to test the model ordinance on actual development proposals pending before or recently adopted by both boards. This test will give the boards a greater

appreciation of the impacts of the proposed regulations as well as a better understanding of the town's existing ordinances and their deficiencies.

Upon development and adoption of the final warrant articles, it is recommended that the planning boards in both towns revisit the town's buffer standards after two years to validate the effectiveness of the regulations and to modify and amend those regulations as necessary so that surface waters of the towns of Candia and Deerfield are protected. Outreach should also be expanded to surrounding towns so that the proposed model ordinance can be considered as a regionally applied tool.

Appendix

2006 New Hampshire Estuaries Project

Candia and Deerfield

Advisory/Technical Committee Contact List

Town of Candia	E-mail	Phone
Elizabeth Kruse	poods@comcast.net	
Susan Carrigan	scarrigan@nhaudubon.org	483-5402
Tom DiMaggio	anuskaknls@yahoo.com	483-2677
Sean James	sean78@earthlink.net	483-0137
Dick Snow	rherbertsnow@netscape.net	483-2722
Staff Contacts		

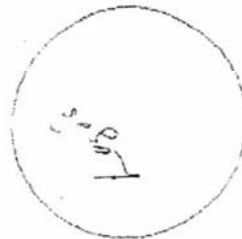
Town of Deerfield	E-mail	Phone
Kate Hartnett	khartnett@thejordaninstitute.org	226-1009
Gile Beye	gilebeye@metrocast.net	463-7416
Joseph Farrelly	akfjrf@webtv.net	941-473-1672
Chuck Reese	creese@rev.state.nh.us	271-2687
Staff Contacts		
Gerry Coogan	gicoogan@tds.net	463-7924 x106
Jane Boucher		463-7924

Technical Assistance	E-mail	Phone
Dawn Genes	dawn.genes@lrwa-nh.org	659-9363
Jodi Castallo	Jodi.Castallo@unh.edu	862-2641
Amy Smagula	asmagula@des.state.nh.us	271-2248
Susan Hoey	susan.hoey@nh.usda.gov	223-0083

SNHPC	E-mail	Phone
Jack Munn	jmunn@snhpc.org	669-4664
Rachel Kelly	rkelly@snhpc.org	669-4664
Brian Trippe	btrippe@snhpc.org	669-4664

ENTERING ^{26"}

SHORELAND PROTECTION AREA



FOR IMMEDIATE RELEASE: JANUARY 31, 2007

CONTACT:

Jack Munn, Senior Planner, AICP
Southern New Hampshire Planning Commission
(603) 669-4664 – Phone (603) 669-4350 – Fax
jmunn@snhpc.org



CANDIA AND DEERFIELD SHORELAND BUFFER PROTECTION OUTREACH

The Southern New Hampshire Planning Commission (SNHPC), in conjunction with the towns of Deerfield and Candia over the past year have been working to develop and implement land use regulations to protect the remaining undisturbed natural shoreline buffers along the Lamprey and North Branch rivers as well as other surface waters within these two communities.

The primary goal of this project is to facilitate an educational outreach program meant to implement a uniform set of land use regulations for both towns in an attempt to protect the remaining undeveloped natural shoreline.

A model ordinance has now been developed and is being presented to both Town Planning Boards. Copies of the ordinance are available from SNHPC.

This project is funded in part by a grant from the New Hampshire Estuaries Project as authorized by the U.S. Environmental Protection Agency's National Estuaries Program.

The Southern New Hampshire Planning Commission is composed of Auburn, Bedford, Candia, Chester, Deerfield, Derry, Goffstown, Hooksett, Londonderry, Manchester, New Boston, Raymond, and Weare. (END)



Town of Candia
NEW HAMPSHIRE

Map # 5
2005 Hi-Res
Orthophoto



Legend

 Townline

Data Source:
Aerial Digital Data (1:24,000)
New Department of Transportation
Town of Candia



The individual municipalities represented on this map and the SPINC make no representation or guarantee in the accuracy of the features and designations of this map.
Map Produced by GIS Services SPINC, June 2008
For repairs or further questions
Contact SPINC: spinc@spinc.org (603) 689-6504
This map is designed for planning purposes only and is not to be used for legal boundary determination or for regulatory purposes.





Sources

Final Report of the Commission to Review the Effectiveness of the Comprehensive Shoreland Protection Act. New Hampshire Department of Environmental Services, Wetlands Bureau, November 30, 2006

2005 Digital Aerial Orthophotography of Southern New Hampshire, New Hampshire Department of Transportation

V. Chase, L. Deming, F. Latawiec. May 1997. Buffers for Wetlands and Surface Waters - A Guidebook for New Hampshire Municipalities.

Environmental Law Institute. 2003. Conservation Thresholds for Land Use Planners

NH Office of Energy and Planning Water Resources Model Ordinances
<http://www.des.state.nh.us/dwspp/guidance_documents.htm>

New Hampshire Estuaries Project
<<http://www.nhep.unh.edu/programs/community-assistance.htm>>

Connecticut River Joint Commissions -- Riparian and Forested Buffers,
<<http://www.crjc.org/riparianbuffers.htm>>

R. Lobdell. 1999. A Guide to Developing and Re-Developing Shoreland Property in New Hampshire – A Blueprint to Help You Live by the Water.

Town of Moultonborough Shoreland Protection Ordinance

Deering Lake Watershed Protection Ordinance

Webster Lake Overlay District

Town of Sutton Watershed Overlay District

Kezar Lake Watershed Protection Ordinance

Town of Chesterfield Zoning Ordinance

New Hampshire RSA 483-B, Comprehensive Shoreland Protection Act

Town of Deerfield Conservation District Ordinances, Sections 210.7 A, B, E

Town of Deerfield General Provisions, Article III Section 305

Town of Candia Wetland Protection Ordinances, Section 10.06

Town of Candia Zoning Ordinances, Section 4.03