

FINAL REPORT
On the
2005-2007 WETLAND INVENTORY & PROTECTION PROJECT
of the
TOWN OF EFFINGHAM
[Carroll County, NH]



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Effingham Conservation
Commission

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SUMMARY

Between July 1, 2005 and June 30, 2007 a wetland inventory and assessment was completed of the Town of Effingham, New Hampshire. Digital geographic information system (GIS) files were reviewed along with any and all pertinent map and literature data associated with wetlands in the region. Aerial photographs (digital orthophotoquads or DOQ's, 1998) were especially helpful in preparing field data sheets and in conducting aerial photograph interpretation (API) delineations of wetlands that were not field-verified. Property permissions were sought with the assistance of the Effingham Conservation Commission, and written permission slips were recorded and marked on tax maps prior to fieldwork.

In advance of field-based delineations and assessments, roadside surveys served the purpose of identifying the location and extent of significant wetlands in Effingham, as well as in providing the necessary data on stream and water body alignments, wetland control lengths (i.e. outflow restrictions for wetlands), as well as sub-watershed data. Digital photographs were also taken during the roadside surveys, many of which documented visual/aesthetic site potential. In addition, data was collected on the location of, and in some cases, the size and condition of culverts along the roadways.

Off-road field surveys of wetlands began in July of 2005 on public conservation lands owned by the Town of Effingham. Field surveys on privately held lands where permission was granted began in October of 2005 and ended in December of 2006. Field delineations of all wetland edges were performed by detecting changes in plant communities and in some cases, analyzing soil morphology using a Dutch soil auger. Angle points on all delineated wetlands were recorded on field data sheets using a hand-held Garmin 12XL global positioning system (GPS) unit with an averaging precision error of between 3.2 and 7.8 m (10.5 to 25.6 feet).

During the field delineations, notes were kept on all wildlife species observations, wetland cover types and soil types, property markers and bounds, wetland control lengths, educational sites, viewing locations, recreational potential, evidence of pollution, historical remains, rare and endangered species, and exemplary natural communities. A numerical log was also kept of all photographs taken of each wetland.

Office –based assessments of each wetland followed the *Method for the Comparative Evaluation of Non-tidal Wetlands in New Hampshire*, or the 'NH Method' (N.H. Department of Environmental Services, 1991). The following functional values of wetlands were assessed:

- 1) Ecological Integrity
- 2) Wetland Wildlife
- 3A) Finfish – Rivers and Streams
- 3B) Finfish – Lakes and Ponds
- 4) Educational Site Potential
- 5) Visual/Aesthetic Quality
- 6) Water-based Recreation
- 7) Flood Control Potential

- 8) Groundwater Use Potential
- 9) Sediment Trapping
- 10) Nutrient Attenuation
- 11) Shoreline Anchoring and Dissipation of Erosive Forces
- 13) Historical Site Potential
- 14) Noteworthiness

Note that functional value #12, Urban Quality of Life, was not assessed owing to the rural character of Effingham in 2005.

Field data was transferred to the NH Method data sheets in the office following the field surveys. GPS data was uploaded into ArcView 3.2 GIS project files and individual maps prepared according to the specifications of the NH Method. The attached assessment data sheets include a location map, a wetland cover class map, and a hydric soil type map for each wetland. Large format maps of the latter two maps were also compiled and printed. Appendix D contains the written specifications for filling out the NH Method data sheets as used in this project.

A total of 28 field days were completed between July 7, 2005 and December 22, 2006. Twelve of these entailed off-road surveys of wetland boundaries and other characteristics, another 5 included a mix of off-road and roadside surveys, and the remainder was entirely comprised of roadside surveys. A total of 7068 GPS points were taken, most of which were at angle points of the wetland boundaries. Over 800 photographs were taken of Effingham wetlands, 91 of which are included as a digital appendix to this report.

Approximately 5130 acres of wetlands were delineated in Effingham, of which 1640 acres were delineated in the field using off-road methods. This represents approximately 20.1% of the Town. The remainder was delineated and mapped using API or a mix of API and off-road methods. A total of 223 types of wetland cover classes were identified among the 1071 wetland units mapped. The mean wetland unit was 4.79 acres, and they ranged from .007 to 131.6 acres. The most common types were forested wetlands, particularly those with a mix of broad-leaved deciduous trees and needle-leaved evergreens (36%). The second most common type was scrub-shrub wetlands (32%), especially those with deciduous-leaved shrubs.

Seventy-six uplands islands were found and mapped within the wetland complexes, representing a total of 223 acres with a mean of just under 3 acres in size. Upland islands represented critical wildlife habitat for several wildlife species, especially those that do not rely on wetlands for their entire habitat needs.



raccoon tracks

Twenty-one of the 23 assessment wetlands contained some amount of fill. In sum, roughly 27 acres of fill in wetlands was calculated from field surveys, or roughly .5% of the total amount of wetlands assessed. This relatively low percentage of fill correlated with the relatively high scores that each wetland received for Ecological Integrity. In only one instance, the Route 25-153 Complex, did the amount of fill exceed the 10% threshold usually associated with impaired wetlands.

A total of 3411 acres of hydric A (very poorly drained) soil was estimated to occur among the 23 wetlands that were assessed. Percentages ranged from 0% to 98%. The most common hydric A soil type included Borohemists Ponged, a very common, inundated mucky soil typically associated with beaver-affected drainageways. The most common poorly drained soil type (hydric B) was Naumberg fine loamy sand, typically found in low elevation outwash plains.

Over 35 miles of streams were mapped in association with Effingham's wetlands. Most of these were first and second order perennial streams such as Phillips Brook or Leavitt Brook on the north slope of Green Mountain, although the third order South River and Wilkinson Brook, as well as the fourth order Pine River enhanced many wetland complexes with a rich diversity of seepage, basin and floodplain types.

Approximately 15% of the 23 assessment wetlands contained some type of impounded water body, most of which were beaver ponds in a long chain of wetland types. Several wetland ponds were formerly dug by settlers for livestock, and some have been enhanced by recent residents. The largest was Hutchins Pond and Heath Pond (Bog), neither of which exceeded 16 acres.

Seven of the assessed wetlands contained rare or endangered species, and eleven of them contained exemplary natural communities as recognized by the NH Natural Heritage Bureau. The upper part of Wilkinson Swamp contained the most of each, with 7 rare plants, 4 rare animals, and 6 exemplary natural communities. Second-ranked was the Lower Pine River Complex, which contained 5 rare plants, 2 rare animals and 3 exemplary natural communities. Rare plants included the Federally-threatened small whorled pogonia and state-threatened sweet coltsfoot (depicted below). Rare animals included nesting great blue herons, common nighthawks, and Martha's pennant dragonfly. Perhaps the most significant natural community discovered was the Black Gum-Red Maple Basin Swamp near the north shore of Province Lake.



Sweet coltsfoot, *Petasites palmatus* from Wilkinson Swamp

NH Method-based wetland assessments resulted in a mean Functional Value Index (FVI) of .65 for all 13 functions among 23 assessed wetlands. The Upper South River wetland had the highest number of top-ranked FVI's (N = 7) along with the highest overall mean FVI (.89), followed by Lower Pine River (N = 5, .83) and Wilkinson Swamp – Upper (N = 4, .87). Wetland Value Units (WVU), which factor size into the FVI assessment, were highest in the Lower Pine River – Heath Pond Bog. This wetland was the largest wetland that was assessed (1547.86 acres), and it received 11 out of 13 of the highest WVU scores. Wilkinson Swamp - Upper followed second with a mean WVU of 486.27, followed by Watts Wildlife Sanctuary with a mean WVU of 309.3



Lower Pine River from the east side of Pine River Road

Final ranking of the 23 assessed wetlands took place according to the stated wishes of the Town of Effingham, that is, by utilizing the 5 principal water resource protection goals contained in the master plan:

- 1) Protect the highest quality wetlands
- 2) Prevent unnecessary damage from flooding
- 3) Protect drinking water supplies
- 4) Reduce sedimentation, nutrient inputs and toxic pollution of Town waters
- 5) Provide protection for rare and endangered species and exemplary natural communities

Each of the assessed wetlands were ranked according to the various attributes that contributed to or supported the above goals, specifically, those with the highest FVI or WVU ranks, the highest flood control potential, the highest groundwater use potential according to the transmissivity (in acre-feet) of the aquifer they lay above, the highest cumulative score for sediment and nutrient removal or attenuation, and those with the largest numbers of rare or endangered species or exemplary natural communities.

Eleven wetlands out of the total of 23 received ranking scores based on the above attributes that exceeded the mean of 62 points. For this reason, these 11 wetlands are recommended for designation as prime wetlands according to RSA 482-A:15, or as exemplary wetlands according to local ordinance. The latter has been revised in draft form to supply the Town with sample language for discussion and review. I have also made several changes to enhance or clarify current ordinance language, or reflects current policy among wetland regulators.

The following report contains a review of methods used in identifying, delineating and assessing each wetland, as well as description of salient attributes of each of the candidate prime wetlands. It also contains several tables, charts and maps that support the text.

Acknowledgments

The author would like to thank the following individuals and organizations for their support during this two-year project:

The New Hampshire State Conservation Committee for their financial support through the “Moose Plate” Grant Program; Jeff Lougee for his participating role as Director of the North Country Chapter of The Nature Conservancy and general counsel for identifying exemplary natural communities in the region; the Effingham Conservation Commission for their unwavering interest and support in organizing the project, coordinating landowner permissions, contacting Municipal officials, sponsoring citizen forums, and performing grant administration for the Town; the Effingham Board of Selectmen and Planning Board for their critical feedback and in-kind support for the project; the NH Natural Heritage Bureau staff for their input and assistance with rare and endangered species; the NH Audubon Society for their data support on rare species especially at the Watts Wildlife Sanctuary; the Green Mountain Conservation Group for their general encouragement towards water resource protection in the region; and Kathleen O’Brien of Antioch University New England for her field assistance during the first summer of roadside surveys. I would especially like to thank Kamalendu Nath, Chair of the Effingham Conservation Commission, for his untiring enthusiasm and organizational support of the project. Lastly, I would be remiss if I did not recognize the hundreds of Effingham residents who willingly gave permission to access their private lands, without which this project would have not have been achievable in its current form.



Effingham Conservation Commission, July 2005

Appendices

A. Maps

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Hydric Soil Map	A-3
Soil Map Legend	A-4
NWI Wetlands	A-5
API Wetlands Map	A-6
Wetland Ranking Map	A-7

2) 24 x 36" maps included separately

Effingham Wetlands Base Map – Cover Classes
Effingham Wetlands Base Map – Hydric Soils

B. Spread Sheets & Charts

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C. Revised Wetlands Ordinance (Recommended)

D. Wetland Assessment Sheets (in separate binder)

Functional Value Specifications	D-1 to D-5
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{In Digital File:

Photographs listed in log above;
GIS shapefiles of all wetland units
Map jpegs created in pdf format}