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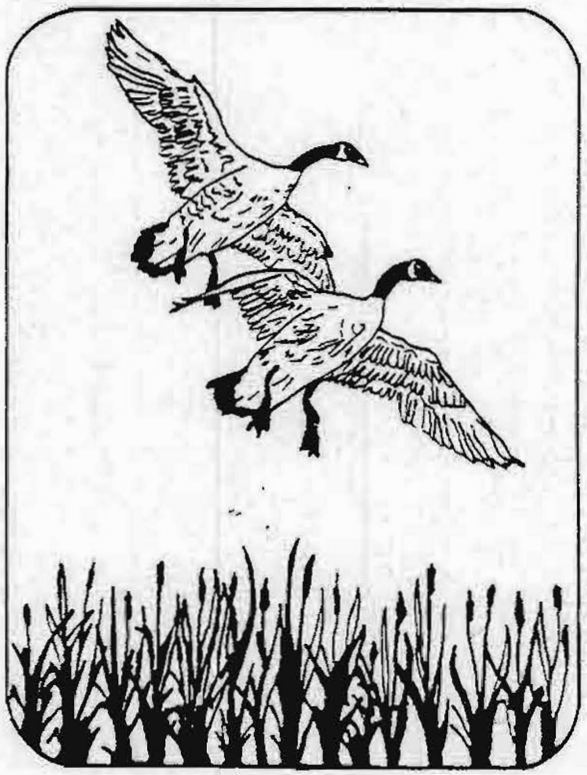
Technical Report
Division of Fish and Wildlife

Freshwater Wetlands Mapping

Technical Methods Statement



April 1986

New York State/Department of Environmental Conservation

New York State

FRESHWATER WETLANDS MAPPING

TECHNICAL METHODS STATEMENT

Prepared pursuant to Article 24 of the Environmental Conservation Law

Division of Fish and Wildlife
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233

Revision filed with NYS Secretary of State, 3/27/86; typographical corrections 4/10/86.

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INTRODUCTION

Freshwater wetlands are an invaluable natural resource of New York State because they provide, among other benefits, flood protection, fish and wildlife habitat, erosion control, open space and water resources. Approximately 50 percent of the nation's freshwater wetlands have been lost or degraded to activities such as filling, draining and polluting (Tiner, 1984). To prevent further loss or degradation of these areas, the State Legislature passed the Freshwater Wetlands Act in 1975 (Article 24 of the Environmental Conservation Law). This Act mandates the Department of Environmental Conservation (DEC) to identify and map freshwater wetlands that are 12.4 acres in size or larger and those smaller wetlands that are of unusual local importance and to regulate the use of these wetland areas. The law also requires that the DEC work cooperatively with the Adirondack Park Agency (APA), to map those wetlands in the Adirondack Park that are defined by both the Freshwater Wetlands Act and Article 27 of the Executive Law.

Article 24 defines freshwater wetlands as lands and waters that support aquatic and semi-aquatic vegetation such as emergents, wetland trees and shrubs, wet meadow vegetation, floating or submerged vegetation or bog mat vegetation. These vegetative communities include a wide variety of plant types, as listed in Section 24-0107 of the Act. Appendix I is a copy of the definition of "Freshwater Wetlands" found in subdivision 24-0107.1. Those wetlands that meet the size and vegetative definition in the Act are protected by a permit program that regulates activities that would impair the functions and benefits of those wetlands.

For areas of the state within the Adirondack Park, Article 27 of the Executive Law defines wetlands as "any land which is annually subject to periodic or continual inundation by water and commonly referred to as a bog, swamp or marsh which are either (a) one acre or more in size or (b) located adjacent to a body of water, including a permanent stream, with which there is a free interchange of water at the surface, in which case there is no size limitation." The list of applicable vegetative types are found in Article 24, but a more detailed description of wetlands is found in the APA's rules and regulations, 9 NYCRR 578.3. The permit program for wetlands located within the Park is administered by APA.

After wetlands within a county are identified and mapped, an administrative hearing is held to give affected landowners and the general public an opportunity to comment on the accuracy of the tentative map for that county. Field inspections may be requested and comments on the accuracy of the map are received. Corrections are made to the map, as appropriate, to reflect field checks and public input. The map becomes final when the Commissioner of the New York State Department of Environmental Conservation signs an Order promulgating the map, and copies of that map are filed with local governments. Notice by mail is provided to affected landowners and local governments prior to a public hearing and at the time of map promulgation.

Mapping of a natural resource is a representation of conditions in the field. It is a process that is based on characteristics and standards as defined by the Freshwater Wetlands Act, wetlands regulations and this document. The wetland boundaries shown on the maps indicate the approximate location of those boundaries. At the scale of the map (1:24,000 or 1" = 2000'), greater precision is not possible. More precise boundary delineation can be requested from the Regional Office of Environmental Conservation or the Adirondack Park Agency. The mapping process does not reflect social or economic considerations, nor does it differentiate between natural and artificially created situations. These factors are considered during the permit process.

This manual describes how regulated freshwater wetlands are identified and the standards and policies used in mapping them. The mapping of wetlands is conducted by the DEC regional staff, except for counties or portions of counties located within the Adirondack Park, where DEC works cooperatively with APA in the mapping effort.

Format of the Maps

The base map consists of a series of quadrangle (quad) maps which divide the state into approximately 960 sections, each containing 7½ minutes of latitude and 7½ minutes of longitude (thus, 7½ minute map) at the scale of 1:24,000. The size of each quad is approximately 24 inches by 30 inches. Mapping is done on a county-by-county basis. Each county has a set of quadrangles containing only the information pertinent to that county. For counties partly within the Adirondack Park, there are two sets of maps, one for the portion of the county outside that Park, and one for the part in the Park.

The outside boundary of the wetlands are drawn on these quads. Each wetland outside the Adirondack Park has an identification code that is unique for the county within which it is located. Map format is more fully described in the Mapping Standards Section.

Wetland Classification

Wetlands are classified (ranked) according to their characteristics and the relative amount of benefits that they provide. Class I is the highest classification for a wetland while Class IV wetlands provide substantially fewer benefits. In portions of the state outside the Adirondack Park, each wetland is assigned a classification during the mapping process, using the criteria set forth in 6 NYCRR Part 664. Within the Adirondack Park, the wetland regulation, 9 NYCRR 578, describes the classification system. Wetlands in the Park are classified at the time of permit review. This document will not describe the methodologies of the classification process, which are covered by Part 664 and Part 578.

SECTION 2

SOURCES OF INFORMATION

There are many data sources (either in map form or other formats) that provide information on vegetative communities or soil characteristics. This data is infrequently available on a statewide basis. The information is also not necessarily of uniform quality from one region to another. Each information source uses definitions and categories that are best suited to its needs. These may not correspond to the definitions set forth in the Act. Careful examination of the definitions and quality of the work is necessary before incorporation onto the regulatory wetlands maps. The sources of information included in this document describe the more commonly available products. Other data may be used if documentation is available on the technical methods and procedures used in their preparation. A review of such statements is necessary to determine the adequacy and utility in effecting the provisions and intent of the Act.

2.1 Base Maps

TOPOGRAPHIC MAPS

Topographic maps are published by both the United States Geological Survey (USGS) and the New York State Department of Transportation (DOT). All topographic data, however, is produced by USGS. DOT purchases that data and prints it without update for their topographic editions. In some parts of the state, the most current topographic information is from the 1940's. The lower left-hand title block on these maps provides the sources of information and their dates.

Most parts of New York State have topographic maps at the 1:24,000, 7½ minute format. The Adirondack Park has 1:62,500, 15 minute quadrangles and a limited number of 1:25,000, 15 minute quadrangles. The 1:62,5000 scale topographic maps have been enlarged to 1:24,000 scale for reference information, but they do not meet National Map Accuracy Standards.

The topographic contour interval is not consistent statewide. In areas of minimal relief, the contour interval is five feet, while in hilly areas, a 20-foot interval is more common. In either case, contour lines are helpful in establishing the boundaries of wetlands because they show the drainage and run-off characteristics of an area.

The USGS used air-photo interpretation to define the approximate location of wetlands (shown by marsh symbols). Vegetation, relief, and drainage are used as indicators. This information is purchased by DOT and added to their maps without revision. These wetland areas do not necessarily correspond to regulated wetlands as defined in the Wetlands Act.

PLANIMETRIC MAPS

Planimetric Maps, produced by DOT, contain all information that topographic maps do, except the topographic data. These are available for the entire state at the scale of 1:24,000. DOT updates the cultural information (roads, buildings, etc.) on these maps periodically. However, drainage information is not updated unless the change is caused by a revision in a transportation corridor.

Planimetric maps have been selected as the base map for wetlands mapping because they are available statewide in a mylar (reproducible) format. This base map also contains no topographic contour lines that could be confused with wetland boundaries.

ORTHO-PHOTO MAPS

The USGS prepares computer enhanced photographs to national map accuracy standards which are available for portions of New York State. These images provide current information about vegetation, existing land use, water bodies and other features. Because they are cartographically correct, they can be directly compared by overlay techniques with other maps such as planimetric maps.

For copies of topographic or planimetric maps or for further information on USGS or DOT maps, contact:

NYS Department of Transportation
Map Information Unit
State Campus
Building 4, Room 105
Albany, New York 12232
(518) 457-3555

For information on ortho-photo maps, contact:

National Cartographic Information Center
US Geological Survey
National Center-Stop 507
12201 Sunrise Valley Drive
Reston, VA 22092
(703) 860-6045

2.2 Biological Freshwater Wetlands Inventory

The Biological Freshwater Wetlands Inventory produced by the DEC's Division of Fish and Wildlife, in conjunction with Cornell University, mapped freshwater wetlands throughout the state over one-half acre in size. This inventory was conducted between 1973 and 1978 using mostly 1968, 1:24,000 (1"=2000') spring season, black and white, stereo aerial photography. Map overlays were produced at the same scale as the photos.

Parcels of wetlands were delineated by their vegetative structural type such as emergents, flooded shrubs, etc. Data was collected for each wetland over 6.2 acres, and included the area of each vegetative covertype within each wetland, whether the wetland was adjacent to water (lake, river or stream), and the wetland's proximity to human activity.

The intent of this survey was to assist DEC staff in evaluating fish and wildlife habitat for management and acquisition purposes. It is a good overall examination of the resource, although very conservative in its estimation of wetland extent. The reliability of this mapping effort was dependent on the quality of the air photos used within a given area and on local topography. This information source has been used for regulatory mapping as a minimal wetland resource map which can be supplemented to produce a more complete assessment of the resource.

For further information on this inventory, see Freshwater Wetlands Inventory, Technical Manual, Cole and Fried, (1981); available at:

N.Y.S Department of Environmental Conservation
Habitat Inventory Unit
Room 532
50 Wolf Road
Albany, New York 12233
(518) 457-3431

2.3 Soils Maps

Soil surveys, published by the United States Department of Agriculture Soil Conservation Service (SCS) in conjunction with Cornell University Agricultural Experimentation Station, have examined most of the state on a county-by-county basis. These reports contain a description of each soil type found within the county and its potential uses and suggested management (as defined by SCS). Also included are detailed maps showing the location of the soil types, surface drainage patterns, wells, cultural features, and special features relating to soils. Both the date of completion of the survey and the scale of the maps vary from one county to another. A summary of the techniques used for preparing soils maps is included in the introduction of each soils survey.

Characteristics of each soil type are listed in the surveys, including permeability and flooding potential. These are further defined by slope. A list of hydric (wet) soils types has been compiled by the SCS and is available from SCS offices. The saturation of the soil and the vegetation present must be verified through field work or other sources of information. A soil may be hydric but contain no wetland indicator species. This is the case in some agricultural drainage areas and mudflats. Additionally, those that are under water and contain no vegetation do not have a soil type listed.

Many factors influence a soil's ability to support wetland vegetation. The depth of the soil, underlying strata, and surrounding topography are all factors in that ability. Soils maps are only an indication of the potential presence of a wetland. It is the presence of wetland vegetation, not hydric soils, that indicate wetlands as defined by Article 24.

Copies of the Soils Surveys or additional information about soils can be obtained from the following:

Agricultural Stabilization and Conservation Service
U.S. Department of Agriculture
811 Federal Building, Room 771
100 South Clinton Street
Syracuse, New York 13260
(315) 423-5176

2.4 National Wetlands Inventory

The National Wetlands Inventory is a nationwide inventory of freshwater wetlands, tidal wetlands and deep water habitats, conducted by the U.S. Fish and Wildlife Service. As of 1986, this inventory was still in progress. In New York State, the Long Island, New York City area is completed. Draft maps for the Lake Plains, and the Saint Lawrence River Valley are under review. The remainder of the state may be mapped in the future.

The survey uses a hierarchical classification system based upon water regime, soils types, and vegetative structural type. Not all categories of this classification system can be used for regulatory freshwater wetlands mapping. More information and definitions of the classification system can be obtained from Cowardin, et al., (1979).

The data for this inventory is compiled using a variety of small scale (1:60,000 - 1:130,000) stereo air photos. The season the imagery was taken in, the chroma (color of film or print, such as black and white, infra-red, etc.) of the imagery, and the scale vary depending on availability. Wetlands one to three acres in size and larger are delineated on the air photos and transferred to a topographic base map. The National Wetlands Inventory identifies a wetland after examination of three major factors: saturated soil or standing water, presence of hydric soils (as defined by SCS) and presence of wetland plants. If any one of these factors is observed, the area is mapped. This does not coincide entirely with the definition of a wetland under the Freshwater Wetlands Act. To map any area as a wetland for regulatory purposes, wetland vegetation must be present.

For a status of mapping by the National Wetlands Inventory, or for copies of maps and information, contact:

CLEARS
464 Hollister Hall
Cornell University
Ithaca, New York 14853
(607) 255-4330

2.5 Wetlands Plant List

As part of the National Wetlands Inventory efforts, the U.S. Fish and Wildlife Service is in the process of compiling a list of wetland plants. The list is grouped on a regional basis. Close to 1,000 plants are listed for the northeast region.

This list categorizes plants by their frequency of occurence in wetlands. Those plants that are always found in wetlands (99% of the time) are referred to as "obligate" plants. They require saturated soil or standing water to exist.

Plants that can tolerate wet or dry conditions are "facultative" plants. This group is divided into three sub-groups:

-Facultative wetland - usually found in wetlands (66-99% of the time);

-Facultative upland - generally found in uplands, (in wetlands less than 33% of the time); and

-Facultative - found in either wetland or upland situtations (found in wetlands 66-33% of the time).

These lists provide an extensive catalogue of plants, complementary to the species list found in §24-0107. It is especially helpful in transitional zones between upland and wetland because preference of the facultative plants is provided.

More information about the wetlands plant list can be obtained from:

National Wetlands Inventory Project
US Fish and Wildlife Service
One Gateway Center
Suite 700
Newton Corners, MA 02158
(617) 965-5100

2.6 Other Wetlands Inventories

Other inventories of wetlands have been and are being done by County Environmental Management Councils (EMC's), County Planning Boards, local Conservation Councils, Universities, etc. These are available on a county or site-specific basis. The definition of a wetland varies depending on the original intent of the inventory and the expertise of its participants. The methodologies and quality of the work also varies. Maps to be used as a source of information for regulatory mapping must be carefully examined for accuracy and compliance with the Freshwater Wetland Act. When these surveys are used, documentation on the inventory methods, sources of information, participants' experience, accuracy, and the classification (or definitions) used must be available.

2.7 Aerial Photography

The use of existing aerial photography is valuable for freshwater wetlands mapping because it:

1) provides a permanent record of the resource as it existed at a set point in time;

2) provides a cost-effective means of obtaining an overview of the area being mapped;

3) is helpful in orientating one's self both in the field and with maps at the office and it provides details not always discernible from the map;

4) often serves as a device for the transfer of information obtained from on-ground observation to maps because it contains landmarks;

5) is useful in the evaluation of wetland hydrologic connections and assist in determining if wetland parcels function as a unit;

6) provides information on the functions and benefits of wetlands, their proximity to natural and cultural features and the existing or potential habitat they provide for fish and wildlife; and

7) may be possible to evaluate the effects of both natural phenomena and human-induced change over time on a particular wetland when more than one date of photography are available. Multi-date imagery, especially that of two seasons, can provide optimal observations of various plant communities and water regimes.

Some upland and wetland vegetative communities can be confused on imagery if the interpreter does not have experience with air photos. Each chroma (color of film or prints), scale, and season utilizes different keys for identification of vegetation. An in-depth description of the clues for identification of wetlands using various kinds of imagery can be found in both biological or photogrammetric publications. The following chart summarizes the advantages and disadvantages of various scales, chromas and seasons of aerial photography. The text following the chart describes these factors individually.

Table 1.

Relative Value of Various Kinds of Aerial Photography For Freshwater Wetlands Mapping

Scale

	Cost	Time for Interpretation	Availability	Ease of data Transferring on to map	Amount of information that can be observed
Large	*	*	*	*	***
Medium	**	**	***	***	**
Small	***	***	**	**	*

Chroma

	Cost	Availability	Saturated Soils	Water Penetration	Identification of most wetland Species	Tonal Range	Vegetative Vigor
Color	**	*	**	***	**	**	**
Color Infrared	*	**	***	*	***	***	***
Black and White	***	***	**	**	*	*	*

Season and Discernible Vegetative Types and Conditions

	Extent of Water	Flooded Trees/shrubs	Emergents	Wet Meadow	Open Water	Submerged and Floating	Soil Saturation
Spring Leaf off	***	***	*	***	***	*	***
Summer	*	*	***	*	*	***	*
Fall Leaf off	**	**	**	**	**	**	**

*** best choice for that feature
** good alternative
* least valuable alternative

SCALE

LARGE SCALE IMAGERY (< 1:12,000)

Generally, the larger the scale of the imagery, the greater the amount of information that can be obtained from it. At those scales, identification of species or vegetative communities can be made by an experienced interpreter. For site-specific projects, large-scale photos are an excellent tool. However, for freshwater wetlands regulatory mapping, that degree of specificity may not be required. Large-scale imagery is also expensive to acquire because many photographs are involved.

MEDIUM SCALE IMAGERY (1:12,000 - 1:40,000)

Most air photos are flown within this scale range. At a medium scale, vegetative communities such as emergents, flooded shrubs, wet meadows, etc. are discernible, although species may not be. This degree of detail is appropriate to the regulatory wetlands mapping effort because a clear boundary of the wetland can be identified and some of the characteristics of that area can be examined.

For one 7½ minute USGS quadrangle, at the scale of 1:24,000, approximately 16 photos are needed for complete stereo coverage. This is considered a manageable number of images to deal with. Because fewer photographs are needed than with large scale imagery, it is less expensive to purchase this scale.

One of the reasons that medium scale imagery is preferred is that the scale is close or identical to the scale of the 1:24,000 base maps. Transferring information from images to maps is facilitated when scales are similar.

SMALL SCALE IMAGERY (1:40,000+)

Many natural resource inventories use small scale imagery for their base-line data. At the scale of 1:80,000, only one photo is required for complete map coverage of a 7½ minute quad (three photos for stereo coverage). This makes small scale imagery convenient to use and inexpensive to acquire.

The use of small scale imagery, however, requires specialized instruments for interpretation and transfer of data onto the base map. A visual aid that enlarges the photo to the scale of the base map must be used to transfer data from the photograph to the map. The purchase of this instrument is expensive. However, the photograph can be enlarged to the map scale. This is a fairly inexpensive alternative. If this is done through the U.S. Geological Survey, they can simultaneously rectify the photo-enlargement to make it optically correct, thus eliminating distortion in the image.

One of the drawbacks for small-scale photos can be the reduced amount of information available compared to larger-scale imagery. There are new high resolution film that overcome some of those drawbacks. The quality of the imagery, the experience of the interpreter, and the availability of specialized equipment or techniques will determine if this photography will be helpful to the mapping process.

CHROMA

BLACK & WHITE

Panchromatic imagery is the most commonly available aerial photography. It is the lowest cost chroma to produce and duplicate, and acquisition costs are therefore lower. A great deal of information can be obtained from this photography. For medium-scale black and white imagery, a good description of interpretation techniques for freshwater wetlands mapping is available in Cole and Fried (1981).

COLOR AND COLOR INFRARED (CIR)

The best chromas for wetland interpretation are color or color infrared. They can show subtle changes in tonality not available with black and white, and provide much greater discrimination in soil saturation. Color imagery most closely resembles the earth as we know it; therefore, it is easy to identify features. This chroma is also the best for interpreting submerged and floating vegetation.

Color infrared shows plant vigor well. Healthy species appear bright red, while plants under stress are in pink or magenta. Saturated soil is black, water is dark blue or black. Although training time to use this chroma is longer, it offers more information for wetlands mapping. Both color and CIR are available most frequently on a site-specific basis. Prints (or transparencies) are expensive.

SEASONS

Each season (with the exception of winter) offers a number of benefits for interpretation of imagery for freshwater wetlands mapping.

1. EARLY SPRING (pre-leaf-out)

   A. Advantages:

      1) trees have not yet "leafed-out" and the vegetated understory or saturated soil can be seen; and

      2) water generally is at the highest level of the year, and flooded deciduous trees and shrubs and those tolerant of a high water table can be easily identified with standing water under the canopy.

   B. Disadvantages:

      1) non-robust emergents, floating and submerged vegetation are not growing at this time of year and therefore are generally not visible, and

      2) there is a short period between ice-out and tree leaf-out. During this period, cloud cover frequently is present. There are very few days when imagery can be photographed during this season.

2. SUMMER

A. Advantages:

1) non-robust emergents such as arrow arrum, pickerelweed and bur-reed are visible only during late spring to mid-fall. August is an excellent time to evaluate the extent of those species; and

2) floating and submerged vegetation such as waterlilies, and wild celery. are also growing and can be inventoried best in late summer or early fall.

B. Disadvantages:

1) tree and shrub canopy cover is complete throughout the summer. Neither the understory nor the degree of soil saturation is visible through the tree crowns; and

2) water and soil saturation are at the lowest levels of the year.

3. LATE FALL (leaf-off)

A. Advantages:

1) leaves have dropped and visibility is possible through the tree crowns,

2) robust and non-robust emergents can be identified at this time. (For non-robust plants, this must be before the first heavy frost); and

3) many floating and submerged species are still evident.

B. Disadvantages:

1) soil is not as saturated as in the spring, so defining the extent of hydric soils may not be possible,

2) time between leaf-drop and the first heavy frost is often very short (about two weeks); and

3) detritus from deciduous trees and shrubs can obscure observation of soil and some plants.

OBTAINING PHOTOGRAPHY

The NYS Department of Transportation publishes a listing of imagery that is available on a site-specific or county-by-county basis. Contact DOT at the address/phone number given in the Base Map section of this document for a copy of this publication.

2.7.1 Aerial photographic interpretation in the Adirondack Park

Stereoscopic aerial photographic interpretation was the major information source for wetlands boundary delineation within the Adirondack Park. A modified version of the National Wetlands Inventory (NWI) classification system was used for this process.

More details on wetlands interpretation and mapping in the Adirondack Park are found in the Adirondack Park Wetlands Map Methodology, in Appendix II.

2.8 Aerial Reconnaissance

If money and expertise are available, aerial reconnaissance is an excellent means of inspecting wetlands quickly and efficiently. An experienced person can examine as many wetlands per hour from the air, as can be visited on ground in an entire day. Diversity and distribution of vegetative species can be observed, data on hydrology collected and the boundary of the wetland defined.

SECTION 3

FIELD DETERMINATIONS/ BOUNDARY DELINEATIONS

3.1 Field Determinations

Field determinations are done to assess the presence and extent of a wetland. These are done at various stages of the mapping process. In the field both plant and animal species can be observed and their abundance recorded. The wetlands' location, vegetative composition, special characteristics and water regime can be entered onto a data sheet while in the field to be used for future reference.

The amount of time required for field checking wetlands is dependent on the density of wetlands in an area and accessibility of these areas to transportation corridors. If a field inspection of the area can not be done, other available information can be used to delineate and classify wetlands, such as aerial over flights or other sources of information as listed in Section 1. If a project is proposed for that site, the wetland can be studied more intensively at that time.

3.2 Drawing the Boundary

The statute defines the wetland boundary as the outer limit of aquatic or semi-aquatic vegetation. Many wetlands, however, do not have abrupt boundaries. Rather, there is a gradient of varying width where wetland and upland vegetation intermix in various percentages. Below is an example of that transitional area.

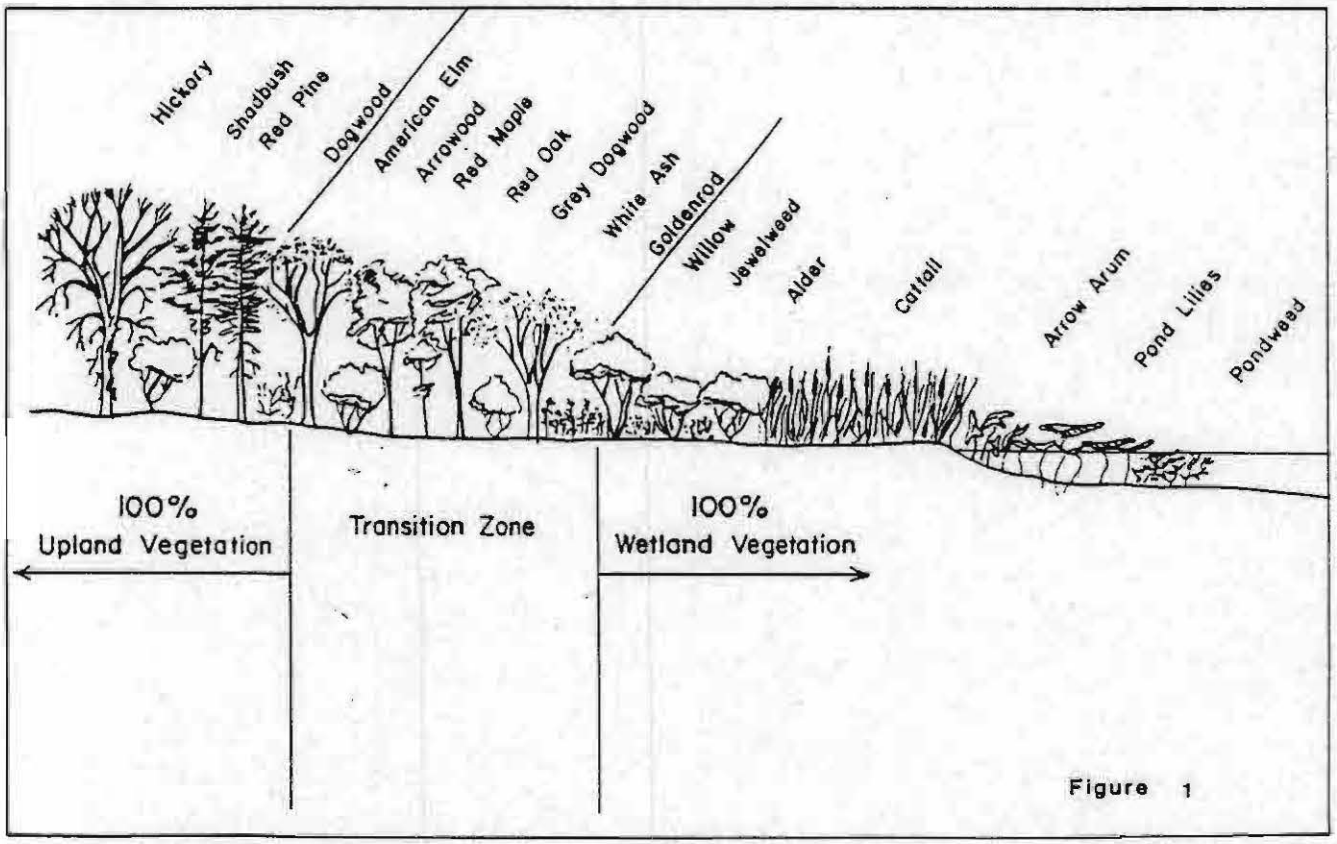


Figure 1

The wetland boundary is to be drawn at the point where wetland indicator species no longer have a competitive advantage over upland species. Wetland and upland plants will mix together at this transition zone. When the intermixing of vegetation is an even gradient, Figure 2 indicates how to define the boundary.

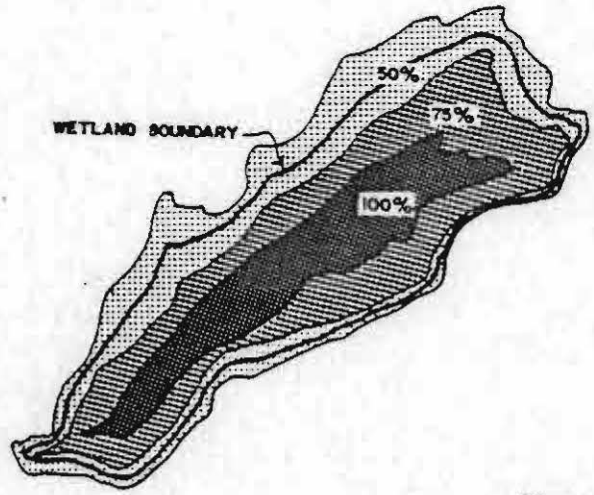


Figure 2

The innermost portion is effectively 100 percent wetland plants, the next concentric ring shows an area of 75 percent wetland species, and the outer ring is a 50 percent mix of wetland and upland plants. It is in the area of the 50 percent mix where the competitive advantage of upland species is demonstrated. The boundary line, therefore, is drawn at the mid-point of that zone.

In situtations where predominately facultative species (as defined on page 11) are found, the ecological association of that community must be examined to determine if the area is a wetland. Facultative species, such as red maple (Acer rubrum), have a wide tolerance of soil saturation conditions and can survive in wet or dry environments. They, therefore, should not be used as the sole indicator of wetland presence or boundary delineation. Other plant species in the community need to be examined. When a facultative species is found in conjuction with obligate plants, such as swamp white oak (Quercus bicolor) or buttonbush (Cephalanthus occidentalis), the area is a wetland. However, if red maple is found with upland plants such as wild cherry (Prunus avium) or common burdock (Arctium minus), the area is an upland.

Within the wetland parcel, there may be upland plant species, either intermixed with wetland plants or in clumps. When these interior clumps of upland plants are large enough to delineate on a 1:24,000 scale map (200 feet in width), they can be mapped as upland inclusions ("islands" of upland species surrounded by wetlands). These inclusions may be regulated by subdivision 24:0107.1(c) of the Act, "lands and waters substantially enclosed by aquatic or semi-aquatic vegetation..the regulation of which is necessary to protect and preserve the aquatic or semi-aquatic vegetation".

In cases where open water adjoins and contains wetland plants (emergent, submerged, or floating vegetation) the boundary is at the edge of the aquatic plant community. Aquatic weed beds are difficult to delineate. Field checking or aerial work (photography or reconnaissance) must be done during the summer or early fall to see the maximum plant extent. When this is not possible, or in waters of high turbidity, another source of information is to be used to draw the boundary at the maximum visible extent of aquatic vegetation on the lakeward side of the wetland.

3.3 Mapping Multiple Vegetative Parcels (outside the Adirondack Park)

Sometimes wetlands are interrupted by breaks in wetlands vegetation, which may be caused by a variety of factors such as slight changes in elevation or constructed obstructions such as roads or railroad beds. Parcels of wetland vegetation are designated as the same wetland if they function as a single ecological unit or are dependent upon each other in providing certain of the benefits listed in subdivision 24-0105.7 of the Act and are within 50 meters (165 feet) of each other. This concept is set out more specifically in DEC's regulations, 6 NYCRR 664. In the figure below, a wetland was intersected by a road.

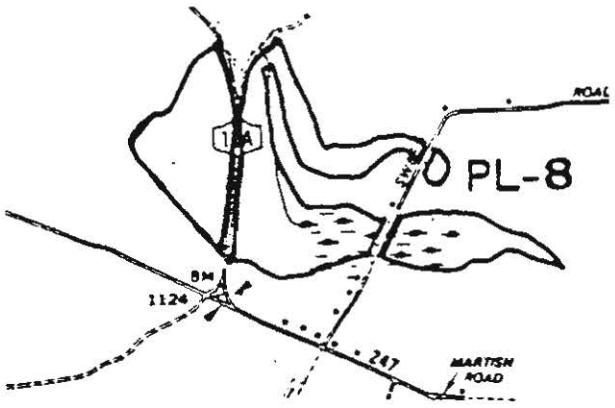


Figure 3

A stream with a culvert connects these two parcels of wetland PL-8. Even though each vegetative parcel (on each side of the road) is of regulatory size in itself, the entire area is considered one wetland because hydrologically they are connected, they are very close together, and if one of the parcels was missing or altered, the functioning of the other parcel would be changed. If the culvert was not there, the two parcels might function independently and would not considered to be the same designated wetland.

Some wetlands are extremely narrow, such as those located along stream beds. When these areas are mapped, their boundaries cannot be readily outlined on the map because the actual width of the wetland may be too narrow to be represented at the 1:24,000 scale. These areas that are called linear wetlands, can be delineated only with a single width pen line.

In some cases, linear wetlands connect larger wetland parcels, as in the figure below. These two wetland parcels and the linear wetland area between them are hydrologically connected, have uninterrupted wetland vegetation, and are functioning as a unit. The complex is, therefore considered a single designated wetland.

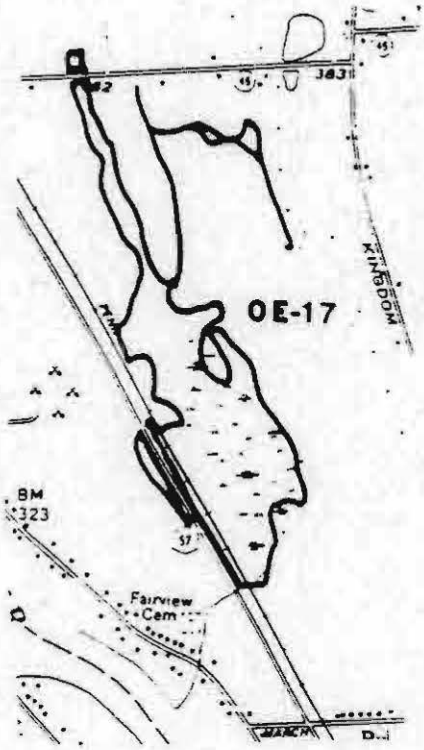


Figure 4

SECTION 4

MAPPING STANDARDS

The NYSDOT 7½ minute, 1:24,000 mylar (chronoflex) planimetric maps are used as base maps. Regulated wetlands are delineated (outlined) on these base maps. Only the outside boundary of each wetland is delineated, not the individual vegetative types within the wetland. Within the Adirondack Park, the wetlands are shaded (colored) to distinguish wetland from upland areas.

4.1 County Index Map

A map-filing label that includes a title, legend, disclaimers, revision block, and the date of promulgation is attached to the right margin of the map. This label will indicate the county name and the map number of the quadrangle. Within a county, each quadrangle map will be sequentially numbered. For example, if the map label describes the quadrangle as "Map 3 of 21", that quad is the third out of a total of 21 maps showing areas wholly or partially in that county. Maps within the county are numbered sequentially, from left to right and top to bottom, with #1 at the top left corner of the county. Index maps will be prepared to show the numbering system within each county. The figure below shows an example of the numbering system for Orleans County.

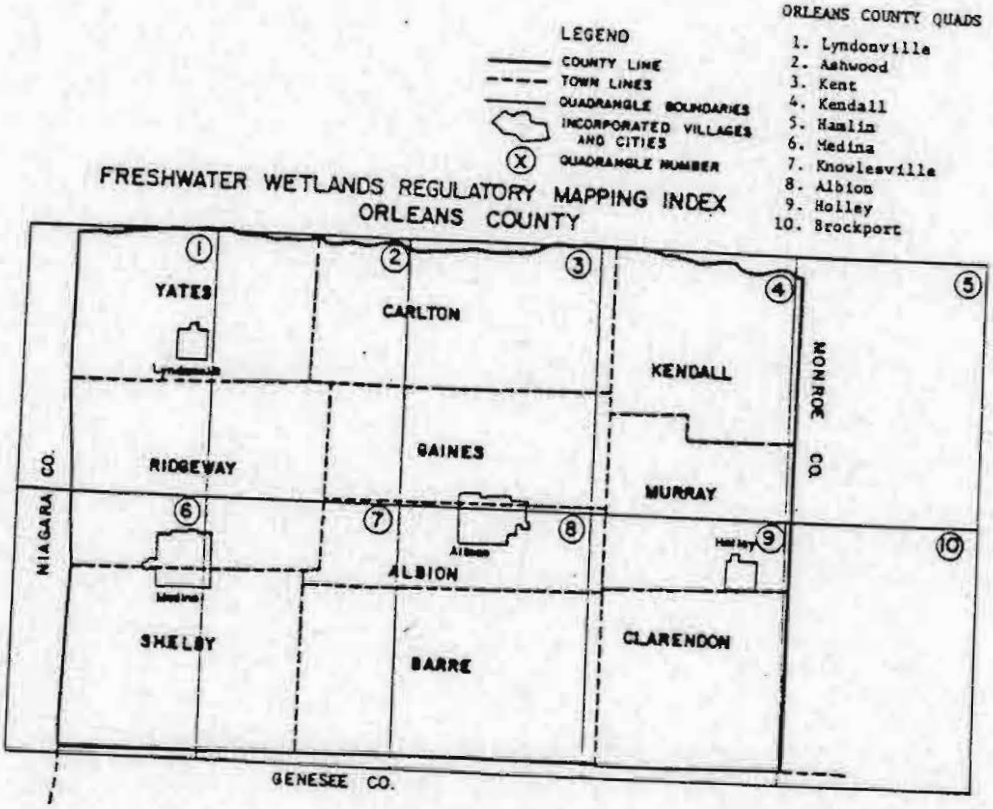


Figure 5

4.2 Wetlands on Borders

Wetlands that are intersected by a quadrangle boundary or a county line must be examined for boundary alignment with the adjoining quad or county.

Areas are mapped on a county-by-county basis. If a wetland intersects a county line, the portion shown for the county in question may in itself not be statutory size, although the wetland in its entirety is of regulatory size.

4.3 Wetlands Under Statutory Size

For areas outside the Adirondack Park, wetlands under the regulatory size (12.4 acres) may be mapped in the following cases:

1) As defined by §24-0301, if the wetland provides functions and benefits that make it of "unusual local importance", as determined by the Department, it is to be mapped, regardless of size. Various units within DEC have information that may assist with this, such as Significant Habitats, Endangered Species, Groundwater Unit etc. Local universities, EMC's or conservation groups may also be helpful.

2) If the wetland crosses a state or national boundary, it is designated as a wetland of unusual local importance if the portion outside N.Y.S. is protected by the adjoining state or nation. The portion of the wetland in New York should be mapped accordingly.

3) When a wetland crosses into the Adirondack Park, the APA can nominate that part of the wetland outside the Park as a wetland of unusual local importance if it regulates that portion within the Park. The portion of the wetland shown outside the Park may, therefore, be under 12.4 acres.

4) Additional criteria for mapping wetlands under statutory size, may be listed in 6 NYCRR 664.

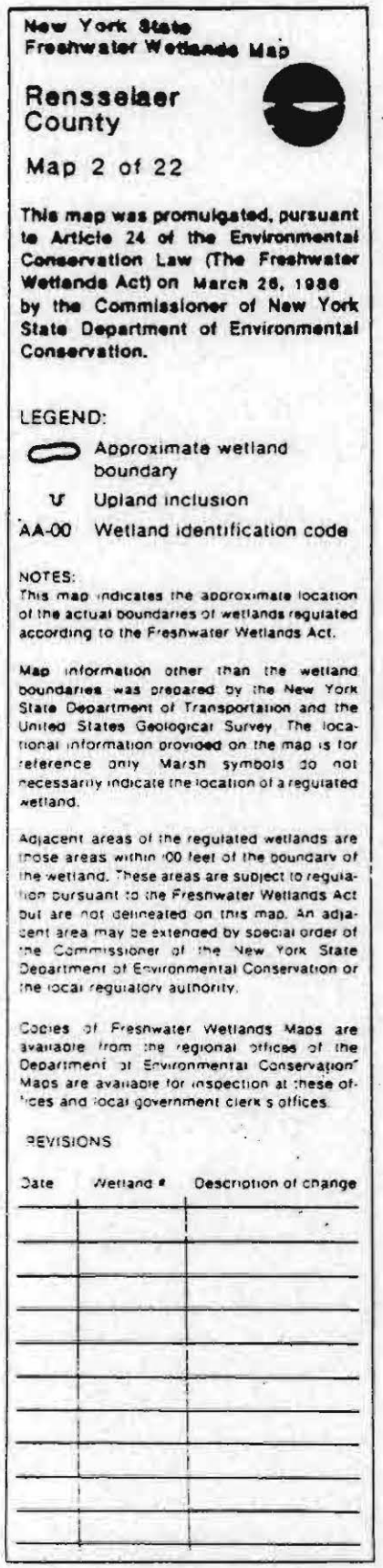
4.4 Wetland Classifications

Classifications of the wetlands do not appear on the maps. For areas outside the Adirondack Park a sheet will be attached to the quadrangle map listing the class of each wetland or portion of a wetland, shown on that map, and the town of location. For wetlands within the Adirondack Park, wetlands are classified when an application for a permit is received, or earlier at the request of the landowner.

SECTION 5

MAP LABELS

5.1 Final Map Filing Label (outside the Park)



A wetland identification code will appear next to each wetland. It is a unique identifier of each wetland within a county. The code is shown more than once for large or irregularly shaped wetland areas. The identification code will be one or two alphabetic characters, followed by a hyphen (-), then a number. No alphabetic characters will appear to the right of the hyphen. For example:

Acceptable	Not Acceptable
A-3	A-3B
AB-81	ABC-3

Each wetland must have only one identification code, regardless of the number of quadrangles, towns, counties, or NYSDEC regions in which it is located.

U Upland inclusion (an enclosed land mass of upland plants species that is surrounded by a regulated wetland).

If the upland inclusion is over 200 feet wide, it can be delineated and the symbol added for identification. If the inclusion is smaller than that, the symbol would not fit on the map and confusion would arise as to its identity, so that inclusion is not shown.

* Extended adjacent area.

Adjacent areas, which are regulated "buffer zones", are normally 100 feet in width around each wetland, are not delineated or indicated on the map. In a case where the adjacent area is extended beyond 100 feet from the wetland boundary, as described in 6 NYCRR 664, the above symbol will appear next to the wetland identification code. The justification for extending the adjacent area of wetland will be on file in the Regional Office of DEC. This symbol will only appear in the legend for those quadrangles that contain an extended adjacent area.

Figure 8

5.2 Other Map Labels

The label below is added to a map when a county boundary is located on that quadrangle. This indicates that not all the wetlands information for the geographic area shown by the quadrangle is shown on that wetlands map.

FOR WETLAND INFORMATION IN THIS COUNTY, SEE THE MAP THAT PERTAINS TO THIS COUNTY OR CONTACT THE REGIONAL OFFICE OF THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION.

Figure 7

For wetlands that cross the Adirondack Park boundary line, only that portion of the wetland outside the Park is shown. A label as shown below, will be attached in order to direct inquiries to the Adirondack Park Agency for wetlands within their jurisdiction.

FOR WETLAND INFORMATION WITHIN THE ADIRONDACK PARK, CONTACT THE ADIRONDACK PARK AGENCY

Figure 8

Quadrangles within each county will be filed and maintained on a county basis. For those maps that contain portions of two or more counties, two or more mylar planimetric maps are used. Each sheet will represent wetland information within one county only.

For quadrangles that contain no wetlands, a label will be attached to the map stating that fact (see below). If necessary in the future, wetlands can be added to the original quad sheet after simply removing the label.

THERE ARE NO WETLANDS ON THIS MAP WITHIN THIS COUNTY THAT ARE REGULATED UNDER THE FRESHWATER WETLANDS ACT.

Figure 9

If a county contains no wetlands, quadrangle maps will be promulgated with the above label on them.

5.3 Final Map Label for Areas inside the Park

OFFICIAL NYS FRESHWATER
WETLANDS MAP
HAMILTON COUNTY, MAP OF

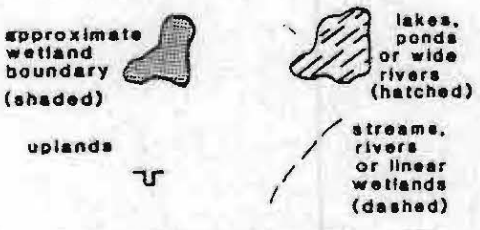
Wetlands shown on this map conform to the definitions in Article 27 of the Executive Law (The Adirondack Park Agency Act) and the Freshwater Wetlands Act. Certain activities in areas within 100 feet of the boundaries of wetlands are also subject to regulation pursuant to the Freshwater Wetlands Act and the Adirondack Park Agency Act.

Wetlands smaller than one acre that are located adjacent to a lake, pond, river or stream, and have free interchange of water with them at the surface, are also protected. In both mapped and unmapped wetlands, a permit is required for activities, such as filling, that impact on the wetland. Landowners should contact the Park Agency (518-891-4050) prior to disturbing any wetlands on their property. The Agency will determine whether a wetland is present and delineate the wetland boundary on any property at the landowner's request. This map will be amended as necessary to show any newly identified wetlands or to correct wetland boundaries.

Base map information was prepared by the New York State Department of Transportation and United States Geological Survey and is provided solely to assist the landowner to locate his property, Lake boundaries and stream locations have been adjusted in some cases based on 1976-1981 aerial photography. Marsh symbols do not necessarily indicate the location of a wetland.

The Adirondack Park Freshwater Wetlands Maps are available at the Adirondack Park Agency office, Freshwater wetlands maps for local areas are also available for inspection at the appropriate County Clerk's and Town Clerk's offices.

LEGEND:



Wetlands maps for the Adirondack Park show those areas regulated under Article 24 of Environmental Conservation Law. These wetlands fulfill the definitions found in both Article 24 and Article 27 of Executive Law. Additional areas of wetlands vegetation that do not appear on these maps, may be regulated by the Adirondack Park Agency under Article 27.

The Adirondack Park Agency Act (Article 27) defines wetlands as "any land which is annually subject to periodic or continual inundation by water and commonly referred to as bog, swamp, or marsh which are either (a) one acre or more in size or (b) located adjacent to a body of water, including a permanent stream, with which there is a free interchange of water at the surface, in which case there is no size limitation."

Because of provision "b" above, lakes, ponds, streams and rivers are shown on these maps. If those areas contain wetlands vegetation, that wetland area will be regulated under Article 27. Mapping is not a requirement of Article 27.

Wetlands are the shaded areas shown on the maps, with a line delineating the approximate boundary of that wetland.

U Upland - area that is not wetland or does not meet the definition or size requirements under Article 24 and/or Article 27.

Figure 10

SECTION 6

APPENDICES

Appendix I *Freshwater Wetlands Definition*

§ 24–0107. Definitions.

1. "Freshwater wetlands" means lands and waters of the state as shown on the freshwater wetlands map which contain any or all of the following:

(a) lands and submerged lands commonly called marshes, swamps, sloughs, bogs, and flats supporting aquatic or semi-aquatic vegetation of the following types:

(1) wetland trees, which depend upon seasonal or permanent flooding or sufficiently water-logged soils to give them a competitive advantage over other trees; including, among others, red maple (Acer rubrum), willows (Salix spp.), black spruce (Picea mariana); swamp white oak (Quercus bicolor), red ash (Fraxinus pennsylvanica), black ash (Fraxinus nigra), silver maple (Acer saccharinum), American elm (Ulmus americana), and Larch (Larix laricina);

(2) wetland shrubs, which depend upon seasonal or permanent flooding or sufficiently water-logged soils to give them a competitive advantage over other shrubs; including, among others, alder (Alnus spp.), buttonbush (Cephalanthus occidentalis), bog rosemary (Andromeda glaucophylla), dogwoods (Cornus spp.), and leatherleaf (Chamaedaphne calyculata);

(3) emergent vegetation, including, among others, cattails (Typha spp.), pickerelweed (Pontederia cordata), bulrushes (Scirpus spp.), arrow arum (Peltandra virginica), arrowheads (Sagittaria spp.), reed (Phragmites communis), wildrice (Zizania aquatica), bur-reeds (Sparganium spp.), purple loosestrife (Lythrum salicaria), swamp loosestrife (Decodon verticillatus), and water plantain (Alisma plantago-aquatica);

(4) rooted, floating-leaved vegetation; including, among others, water-lily (Nymphaea odorata), water shield (Brasenia schreberi), and spatterdock (Nuphar spp.);

(5) free-floating vegetation; including, among others, duckweed (Lemna spp.), big duckweed (Spirodela polyrhiza), and watermeal (Wolffia spp.);

(6) wet meadow vegetation, which depends upon seasonal or permanent flooding or sufficiently water-logged soils to give it a competitive advantage over other open land vegetation; including, among others, sedges (Carex spp.), rushes (Juncus spp.), cattails (Typha spp.), rice cut-grass (Leersia oryzoides), reed canary grass (Phalaris arundinacea), swamp loosestrife (Decodon verticillatus), and spikerush (Eleocharis spp.);

(7) bog mat vegetation; including, among others, sphagnum mosses (Sphagnum spp.), bog rosemary (Andromeda glaucophylla), leatherleaf (Chamaedaphne calyculata), pitcher plant (Sarracenia purpurea), and cranberries (Vaccinium macrocarpon and V. oxycoccos);

(8) submergent vegetation; including, among others, pondweeds (Potamogeton spp.), naiads (Najas spp.), bladderworts (Utricularia spp.), wild celery (Vallisneria americana), coontail (Ceratophyllum demersum), water milfoils (Myriophyllum spp.), muskgrass (Chara spp.), stonewort (Nitella spp.), water weeds (Elodea spp.), and water smartweed (Polygonum amphibium);

(b) lands and submerged lands containing remnants of any vegetation that is not aquatic or semi-aquatic that has died because of wet conditions over a sufficiently long period, provided that such wet conditions do not exceed a maximum seasonal water depth of six feet and provided further that such conditions can be expected to persist indefinitely, barring human intervention;

(c) lands and waters substantially enclosed by aquatic or semi-aquatic vegetation as set forth in paragraph (a) or by dead vegetation as set forth in paragraph (b), the regulation of which is necessary to protect and preserve the aquatic and semi-aquatic vegetation; and

(d) the waters overlying the areas set forth in (a) and (b) and the lands underlying (c).

Appendix II Adirondack Park Wetlands Mapping Methodology

This appendix will outline the source data and the system used in the Adirondack inventory and map preparation and, in particular, those changes required to accurately map wetlands as small as one acre. Four basic steps were taken to produce this map product: 1) interpretation of aerial photography (the primary information source), 2) enlargement of the interpretation to the approximate scale of standard quadrangle map sheets, 3) use of other information sources to refine the boundaries, and 4) transfer of the boundaries to a cartographically controlled base map.

Section I, following, describes these four steps in detail. Section II is a discussion of the accuracy of the maps, the National Wetland Inventory Classification methods and the identifiers used for individual wetlands.

I. Interpretation of Aerial Photography.

The initial steps used are those endorsed by the U.S. Fish and Wildlife Service and employed elsewhere in the United States as part of the National Wetlands Inventory (NWI). The details of the air photo interpretation techniques are contained in the report prepared by the principal investigators for the Adirondack Wetlands Inventory, D. Bogucki and G. Gruendling, entitled "Wetlands Interpretation and Mapping Project for the Adirondack Park" (1982).

Wetland boundaries are plotted using 1976-1982 small scale "leaf off" aerial photography taken from a high altitude as a part of the National High Altitude Photography program of the U.S. Geological Survey. By using small scale photography, large areas can be seen on each photograph which aids in wetland interpretation. A single photograph covers an entire standard 7.5' quadrangle sheet. Two additional photographs form a stereographic set. The outer boundaries of the wetland are plotted on clear plastic sheets laid on top of the "quad-centered" photograph; this enables the separation of the sheet, with the plotted boundaries on it, from the underlying photograph.

Some modifications of the NWI techniques are employed in the Adirondack Inventory because of the small wetland size, terrain variation, regional variation in the Park, and the large numbers of coniferous wetlands where foliage on the trees obscures the ground. The one acre size criterion requires about double the usual photo intrepretation time. Air photo interpreters also spend additional time field checking their work to ensure familiarity with local wetland vegetation and therefore increase the reliability of the photo interpretation. Medium scale (1 inch = 2,000 feet) aerial photography serves as a further source of information to assist in accurate identification of wetlands.

Enlargement of the Air Photo Interpretation for large-scale field review and boundary refinement

The air photo and the plastic overlay showing the air photo interpreter's analysis are about 9 X 9 inches in size. Photographic techniques enlarge these to a medium scale (1" - 2,000' or 1:24,000 scale). The result is a working map the same size as the 7 ½ minute series of base maps that are used for final map preparation. This sheet is about 2 X 3 feet in size. Camera lenses used for the original photography and for enlargement cause slight distortion when compared with a map prepared to national map accuracy standards, but because the photo and overlay are matched, this enlargement is an excellent reference tool for field checking of boundaries as they relate to roads, buildings and other features seen both in the photo and on the ground. The enlargement is called "unrectified" because of the distortion.

Wetland Boundary Refinement

Other sources of information are used to refine the wetland boundaries on a paper copy of the enlargement. These sources include medium-scale air photography, soils maps, wetland delineations shown by the U.S.G.S. on topographic maps, and field visits by DEC and APA personnel.

Wetlands along shorelines and submerged aquatic wetlands that were obscured by flooded conditions in the early spring photography are added based on field visits. All mapping decisions are checked by Agency staff field biologists. Very small shoreline wetlands are not mapped; these boundaries can be identified in a field meeting with a landowner or permit applicant.

Transfer of Boundaries to Final Map

A base map is prepared by attaching a clear plastic overlay to a standard NYS Department of Transportation, 7½ minute planimetric quadrangle and drafting onto the overlay the shorelines of major waterbodies, lakes and rivers which serve as common reference lines between the source enlargement of the photo overlay and the controlled base map. Streams are drafted using a dashed line. Minor differences in the waterbody edges between the final maps and the planimetric map reflects the fact that USGS Orthophoto quads developed from recent aerial photographs are used to update the relatively old planimetric shoreline boundaries. Next, the outer most wetland boundary is transferred to the base map overlay from the unrectified enlargement.

The transfer process uses a transferscope or direct comparison of the unrectified air photo enlargement and our orthophoto base map to eliminate the photographic distortion of the enlargement and accurately locate wetland boundaries on the base map.

Streams or linear wetlands along streams or shorelines which are delineated by the photo interpreter but not shown on the base map are added as dashed lines.

During the transfer process any areas that were surrounded by wetlands were labeled with a U for upland and waterbodies were cross-hatched.

II. Cartographic Accuracy

The wetland map uses the best available technology for large-area mapping.

Features, such as roads, buildings, lake shores, depicted on the maps are shown relative to each other and relative to the map grid (for example latitude and longitude). These features conform to the national map accuracy standards of the base maps.

The original wetland boundary lines shown on the map and derived from the source photography are about 150 feet wide. In general, the accuracy of line placement is within this tolerance. The inside edge of the line is the intended boundary. Accurate field delineations of the actual wetland boundaries can be requested of Agency staff.

Classification

The inventory techniques used by the NWI specify the use of a covertype/hydrologic/substrate classification scheme which is applied to each wetland area. The methodology and parameters employed are described in "Classification of Wetlands and Deepwater Habitats of the United States" by L.M. Cowardin et al., 1979 and in "Photointerpretation Conventions for the National Wetlands Inventory", July 17, 1985, U.S. Fish and Wildlife Service. This system labels each wetland with a code that gives us basic covertype and hydrologic information as well as some other information in reference to the wetland.

The photo enlargements used for field checks have the wetland classification labels and are available for inspection together with the map showing the outer boundary. The classification is important basic information which can be used as one of the tools to predict the wetland's value rating as described in the wetland regulations. The value rating is used to determine the standards to be applied by the Agency in evaluating the environmental impact of proposed wetland land uses.

Wetland Identification

Rather than labeling each wetland on a Quad sheet with a number, the Agency identifies a wetland using a base map co-ordinate which falls within and near the center of the wetland. The base map co-ordinate is composed of two numbers: the first is derived from the horizontal margin (top or bottom) of the map; the second is derived from the vertical margin (left or right) of the map. These two numbers describe two lines which intersect at a point. The margin numbers are called Universal Transverse Mercator (U.T.M.) grid numbers. Their prime advantage is that they are found on most base maps for New York State, and they are found on most base maps for New York State, and they are geographically precise.

The wetlands are assigned an identifier number only after a boundary determination is requested or for some other communicatons purpose.

Appendix III

ADDRESSES OF REGIONAL OFFICES OF ENVIRONMENTAL CONSERVATION AND THE ADIRONDACK PARK AGENCY

County Addresses / Telephone Numbers

Nassau, Suffolk
DEC—Bldg. 40, SUNY at Stony Brook
Stony Brook, New York 11790 (516) 751-7900

New York City
DEC—2 World Trade Center, 61st Floor,
New York, New York 10047 (212) 488-2755

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester
DEC—21 So. Putt Corners Road
New Paltz, New York 12561 (914) 255-5453

Albany, Montgomery, Rensselaer, Schenectady
DEC—2176 Guilderland Avenue
Schenectady, New York 12306 (518) 382-0680

Columbia, Delaware, Greene, Otsego, Schoharie
DEC—Route 10, Jefferson Road
Stamford, New York 12167 (607) 652-7364

Clinton, Franklin
DEC—Route 86,
Ray Brook, New York 12977 (518) 891-1370

Fulton, Saratoga, Warren, Washington
DEC—Hudson St., Box 220
Warrensburg, New York 12885 (518) 623-3671

Essex, Hamilton, portions of other counties within the Adirondack Park
Adirondack Park Agency—P.O. Box 99,
Ray Brook, New York 12977 (518) 891-4050

Jefferson, Lewis, St. Lawrence
DEC—State Office Building
317 Washington Street
Watertown, New York 13601 (315) 785-2245

Herkimer, Oneida
DEC—State Office Building
207 Genesee Street
Utica, New York 13501 (315) 793-2554

Broome, Cayuga, Chenango, Cortland, Madison, Onondaga, Tompkins, Oswego, Tioga
DEC—Fisher Avenue
P.O. Box 5170,
Cortland, New York 13045 (607) 753-3095

Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne, Yates
DEC—6274 E. Avon-Lima Rd.
Avon, New York 14414 (716) 226-2466

Allegany, Cattaraugus, Chautauqua
DEC—128 South Street
Olean, New York 14760 (716) 372-8678

Erie, Niagara, Wyoming
DEC—600 Delaware Avenue
Buffalo, New York 14202 (716) 847-4550

SECTION 7

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