USE OF NATIONAL WETLANDS INVENTORY DATA FOR WETLAND ASSESSMENT

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ABSTRACT

The primary objective of the National Wetlands Inventory (NWI) is to produce accurate and comprehensive information about the nation's wetlands. To date, detailed wetland maps are available for approximately 40% of the lower 48 States and 10% of Alaska. Wetland maps show the location, configuration, density, and vegetative characteristics of wetlands and deepwater habitats. To compliment the nationwide mapping effort, the NWI has developed lists of wetland plant species, developed a wetland values database and, in conjunction with the Soil Conservation Service, is in the process of formulating a list of hydric soils. These products have been used to help make various types of wetland assessments and answer some of the questions which are inherent in any wetland evaluation. Potential uses and applications for the wetland information which the NWI is disseminating are numerous and diverse. Specific examples of how NWI products are being used in resource management activities are presented.

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INTRODUCTION

Over the past nine years the objective of the National Wetlands Inventory (NWI) has been to develop and disseminate technically sound and comprehensive information on the characteristics and extent of the nation's wetlands. The project has generated two very different kinds of information about wetlands of the United States: 1) National statistics on the current status of wetland habitats and indicators of overall trends in wetland gains and losses and, 2) detailed wetland maps for geographic areas of critical concern. It is intended that this information will provide the necessary baseline data for making timely and accurate resource decisions with respect to wetland ecosystems.

OVERVIEW AND STATUS

The National Wetlands Inventory utilizes high-altitude photography to map wetlands. Within the limitations of scale and quality of the photography, all discernable wetland habitats are delineated. The classification system used is that based on Cowardin et al. entitled Classification of Wetlands and Deepwater Habitats of the United States (1979).

The classification system is hierarchical and is based primarily on hydrologic conditions, soils and vegetation, but is also structured to include information on water chemistry and developmental modifications. The System defines the physical/topographical limits of wetlands according to ecological characteristics. It should be emphasized that while the classification scheme in itself does not provide value judgements, it is

sensitive enough to incorporate the necessary biological information which can be used as part of the evaluation process (Adamus, 1983). Thus the classification system is flexible enough to reflect changes as our understanding of wetland functions and values evolve and as more information becomes available.

Currently, the Inventory produces two series of wetland maps, a small-scale (1:100,000 or 1:250,000), and a large-scale (1:24,000) wetland map. The 1:100,000 scale maps cover approximately 1,700 square miles, and are used chiefly for watershed and regional planning purposes. At the present time they are being produced only in limited areas on a requester pays basis. The principal map product is the large-scale map which shows the location, shape and characteristics of wetlands and deepwater habitats superimposed on a United States Geological Survey base map. These detailed maps have proven to be quite useful for site-specific project evaluation and are the most sought-after map product.

To date, approximately 10,000 highly detailed wetland maps covering 40% of the lower 48 states and 10% of Alaska have been produced and distributed. Mapping has been completed for eight states: Arizona, Connecticut, Delaware, Hawaii, Massachusetts, New Jersey, Rhode Island, and Vermont. Wetland mapping for portions of thirty-nine (39) other states is in progress.

Other Products

In addition to wetland maps, several other types of information are produced to supplement and aid in the inventory effort. These include lists of hydric soils and hydrophitic vegetation, wetland status reports, and computerized wetland value databases.

One of the most significant products which the NWI has produced has been the compilation of the current status of wetlands in the lower 48 States. The national wetlands status and trend analysis arose from the need for national estimates of the current extent of our nation's wetland resources and on corresponding losses and gains over the past two decades. The final report entitled "Wetlands of the United States: Current Status and Recent Trends" (Tiner, 1984), identifies areas where wetlands appear to be in the greatest jeopardy and presents existing regional and national information on wetland trends based on the statistical survey methods. This report is extremely useful because it documents wetland losses and causes for the losses. Based on this information, policy and decision makers should be able to identify particular regions or states where developmental pressures are taking the greatest toll on the wetland resource base and determine what corrective measures are feasible.

Wetland Soils List

In addition to wetland status reports, a list of the nation's hydric soils is being prepared by the Soil Conservation Service (SCS) in cooperation with the National Wetlands Inventory. Hydric soils are those that exhibit

soil saturation for significant periods or, frequent flooding for long periods during the growing season (U.S.D.A., Soil Conservation Service, 1981). The list includes both hydric soils (essentially always associated with wetlands) and soils that exhibit hydric conditions under certain circumstances. The hydric soils list should be useful for making wetland determinations in conjunction with the use of soil survey maps. Interim lists of hydric soils for each state are available from soil scientists at SCS State Offices. A final list should be available by October, 1985.

Wetland Plant List

The NWI is also preparing a list of vascular wetland plants. The term "hydrophyte" is defined as any plant growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water (Cowardin *et al.*, 1979). The wetland plants are divided into four indicator categories based on the frequency of occurrence in wetlands. These categories are: (1) obligate - always found in wetlands (95% of the time), (2) facultative wet - usually found in wetlands (66-95% of the time), (3) facultative - sometimes found in wetlands (33-66% of the time), and (4) facultative upland - seldom found in wetlands (<33%). The NWI is creating a wetland plant database which not only includes the list of hydrophytes by common and scientific name, but also contains information on the plant's physiology, geographic distribution, and wetland indicator status. Of an estimated 5,400 species of plants believed to occur in U.S. wetlands, about 4,000 species have been entered into the database. Work on the remaining species is to be completed by October, 1986.

Wetland Values Database

The NWI is building a wetland values database to help assimilate information on the functions and values of wetlands contained in the scientific literature. The database consists of geographically referenced abstracts of scientific articles and reports addressing such wetland values as habitat, water quality, hydrology, and food chain functions. More complete information on wetland values will aid in developing priorities for wetland protection and will assist in identifying the significance of wetland acreage losses from the local or state perspective. Currently, the database contains 4,203 articles. Additional articles and information are being added continually. Ruta-Stuber (1983), has presented a detailed discussion of the wetland values database.

APPLICATION OF NWI INFORMATION FOR WETLAND ASSESSMENT

Detailed wetland maps are currently used by local, state and Federal agencies as well as by private industry and organizations for many purposes including comprehensive resource management plans, environmental impact assessments, permit reviews, facility and corridor siting, oil spill contingency plans, natural resource inventories, wildlife surveys, and many other uses. Collectively, there are well over sixty (60) documented uses for NWI wetland maps alone (see Table 1). This, taken in combination with value database information, plant lists, soils list, etc., means that there are probably a multitude of other unidentified uses and applications for the wetland information.

Table 1 Identified uses for National Wetlands Inventory Maps.

PLANNING AND ANALYSIS (General)

Baseline environmental data
Environmental impact statements
Environmental assessments
Comprehensive plans
Land use planning
Area-wide planning
Watershed planning
Master plans
Characterization
Wildlife habitat
Species management
Rare and endangered species
Research studies
Water supply
Water quality
Environmental contaminants
Pollution control
Solid waste disposal
Sanitary sewers, lagoons
Mitigation

REGULATORY (General)

Permits -dredge and fill
Permits -drainage
Permits -other
Permitting
Unsuitability criteria
Litigation

DEVELOPMENT (General)

Federal Water Development
State Water Development
Local Water Development
Agricultural Development
Urban Development
Watershed Development
Flood Control, Flood Plain Development
Energy Development
Sanitary sewers, lagoons
Solid waste disposal
Highway design and planning

PROTECTION (General)

Natural/scenic programs
Critical/sensitive programs
Avoidance
Ecological significance
State Wetland legislation
Federal Wetland legislation and E.O.
Water incentive programs
Acquisition - Federal
Acquisition - State
Acquisition - local and private
Zoning and ordinances

OTHER

Reference
Hunting
Fishing
Recreation (other)
Education - training
Inventory and Monitoring
Cumulative impacts

To be able to apply NWI information in making any type of wetland assessment means that several criteria must be met. First, the NWI data must be accurate enough to provide sound ecological information. The information must be readily available for use; the wetland classification system must be sensitive enough to be able to incorporate additional detailed information; the products must have few regional limitations or biases and; it must be compatible with other collateral data which may exist.

Assessing the value of wetlands does not always involve arriving at a numerical value or ranking. For some types of assessments it may be sufficient to determine the type, size, and location of the wetland habitat. It is this kind of an assessment where NWI map information can be most helpful. This implies however, that the ecological and social values of an area are recognized in context with things such as surrounding land use and any proposed alterations.

Generally, wetland values can be dissected into three (3) major categories. These include:

- Fish and Wildlife Values (value of habitats utilized by fish and wildlife species)
- Environmental Quality Values
- Socio-Economic Values

While these are generic headings, they encompass most of the known functions and values traditionally associated with wetlands. There are

excellent examples of how NWI information has been used to assess wetlands for each of these categories, however, the specific examples presented here are most closely aligned with determining fish and wildlife habitat values.

One of the most important factors in determining the values of wetlands as suitable habitats for animals or fish is the density and diversity of vegetation. In fact, the diversity of vegetation present at a site is often a major determinant of wildlife diversity (Golet 1978). In many instances this is the key to utilizing NWI products since the wetland maps identify and classify wetland vegetation types.

There are many examples of how NWI maps have been used in wetland assessments. As an example of the specificity of how accurate wetland mapping can be employed by the wildlife biologist, Yellow Rail (*Coturnicops noveboracensis*) habitat requirements were studied with the use of NWI maps. An important component of this bird's preferred habitat in the breeding grounds of Michigan, is open bog-sedge meadow dominated by dense stands of *Carex lasiocarpa* (U.S.D.I., Fish and Wildlife Service, 1983). In some areas, wetland maps were used to identify these open sedge meadows and provide indications of advancing seral stages, fluctuating water levels and the impacts of fire management on the habitat suitability for Yellow Rails.

However, it is not always vegetation which provides information for wetland assessments. Since the classification on the wetland maps also provides descriptive terms for soils and water chemistry, this information has been used by the Minnesota Department of Natural Resources to locate and inventory that state's ecologically significant peatlands. Peatlands are

the wildest, most remote and least known of Minnesota's landforms (Dinndorf, 1985). The State's efforts to map and evaluate its peat resources have become increasingly important as Minnesota has been pressured to excavate and develop some of its estimated 7 million acres of peat deposits. Delineation of organic soil deposits, raised bogs, teardrop islands and ribbed fen formations on NWI maps provide the only resource information available for some of the more remote portions of the State. Minnesota has utilized the information to help locate and classify peat deposits and, based on additional evaluation criteria, has recommended that certain ecologically significant areas be placed off limits to development.

Another area where the NWI could play an important role is that of wetland restoration and rehabilitation. In some states such as Iowa, where losses of prairie pothole wetlands exceed 90% (Bishop, 1981), it becomes essential to not only adequately protect the remaining wetland ecosystems, but also to consider wetland restoration. The Fish and Wildlife Service already has an active program in the prairie pothole region which is restoring drained or partially drained basins by acquiring management rights from landowners on a ten-year lease arrangement. As soon as additional NWI maps are completed for these areas, the mapping codes can help identify those areas which technically qualify as wetlands but have been partially drained or degraded. Once identified, these areas can be more effectively and economically evaluated as candidates for the restoration project.

Research is also investigating the role seed banks play as a source of plants revegetating a restored wetland. In a recent study, seed bank composition and abundance was cross referenced with the wetland status

information from the NWI hydrophitic plant list to provide indicators of abundance of remnant hydrophytes and drawdown species pioneering into the study area (see Table 2). Information such as this will have important management implications for regulating the depth of water to be maintained when reflooding a basin to either promote or discourage species germination.

SUMMARY

The information generated by the National Wetlands Inventory is not universally applicable to all wetland evaluations or assessments. Rather it is simply a tool which may have utility in some instances and can be used effectively to answer some of the initial questions inherent in any evaluation process. Site specific evaluation of wetland areas is still a very necessary component of functional assessment and should take into consideration many additional factors which cannot be conveyed on a resource map.

Table 2. Species diversity of the seed bank from a drained prairie wetland basin. Wetland status indicators are expressions of each species' frequency or occurrence in wetland versus non-wetland habitats. Wetland status coding is based on the following criteria:* OBL-Obligate hydrophyte - always found in wetlands; FACW - Facultative - usually found in wetlands; FAC - Facultative - sometimes found in wetlands; FACU - Facultative - seldom found in wetlands; ND - Not designated; NW - non wetland species; DRA - Drawdown - species which may pioneer into wetlands during drawdown.

Species	Common Name	Wetland Status
Abronia fragrans	---	NW
Agrostis sp.	(unknown grass)	ND
Amaranthus retroflexus	(redroot amaranth)	ND
Ambrosia sp.	(ragweed)	FAC - ND
Bidens comosa	(beggartick)	FACW? DRA
Brassica kaber	(wild mustard)	NW
Chenopodium album	(lamb's quarters)	FAC?
Cirsium arvense	(canadian thistle)	ND
Cyperus esculentus	(chufa)	FACW?
Cyperus schweinitzii	---	FAC
Echinochloa crusgalli	(barnyard grass)	FACW DRA
Helianthus sp.	(sunflower)	FAC? - FACW
Iva xanthifolia	(sump weed)	FAC?
Lycopus americanus	(bugleweed)	OBL
Melilotus alba	(sweet clover)	FACU
Monarda punctata	(beebalm)	NW
Panicum sp.	(grass)	FAC - ND
Polygonum aviculare	(prostrate knotweed)	FACW
Polygonum convolvulus	(black bindweed)	ND
Polygonum lapathifolium	(smartweed)	OBL
Portulaca oleracea	(purslane)	FAC?
Ranunculus sp.	(buttercup)	FAC - OBL
Rumex acetosella	(sheep sorrel)	FACW?
Scirpus sp.	(rush)	FAC - OBL
Setaria sp.	(bristlegrass)	ND
Setaria viridis	(bristlegrass)	NW
Silene noctiflora	---	NW
Solanum nigrum	(nightshade)	NW
Sonchus sp.	(sowthistle)	FACW - ND
Trifolium sp.	(clover)	ND

* Adapted from U.S.D.I., Fish and Wildlife Service list of wetland plants, 1982.

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