
Status of the National Wetland Plant List

The National Wetland Plant List has undergone important taxonomic and nomenclatural changes since the first and only approved list of wetland plant indicator statuses was created in 1988. Regional and national revisions are ongoing, and wetland professionals can participate in recommending changes through an online platform. The author discusses what has happened to date and highlights future efforts.

BY KATHERINE TROTT

The effort to develop a comprehensive wetland plant list began with the U.S. Fish and Wildlife Service (FWS) in 1976 and paralleled the development of their wetland classification system for the National Wetlands Inventory (NWI), which culminated in *Classification of Wetlands and Deepwater Habitats of the United States* in 1979 (Cowardin et al. 1979). A brief footnote in that publication mentions that the FWS intended to produce “a list of hydrophytes and other plants occurring in wetlands of the United States” for use in conjunction with the NWI. At about the same time, the Natural Resources Conservation Service (NRCS), then known as the Soil Conservation Service (SCS), initiated an effort to prepare a preliminary list of hydric soils, again for use with the NWI. Through a series of subsequent drafts, the FWS effort eventually led to the production of the National List of Plant Species That Occur in Wetlands (hereafter called the List, with specific versions noted by their year of establishment) and the associated regional lists.

The FWS initially derived the lists by searching some 300 national and regional floras and other scientific publications. This effort produced the Annotated National Wetland Plant Species Database, which documented the taxonomy, nomenclature, distribution, and ecology of wetland flora in the United States. In 1987, the SCS—through a contract with the Biota of North America Program (BONAP)—produced important taxonomic and nomenclatural standards from various drafts of the wetland plant lists, which culminated in List 88. During the initial development of the database, a wetland rating system was created based on habitat descriptions derived from the various regional floras, botanical manuals, and other scientific works.

In the early 1980s, the four primary federal agencies involved in wetland delineation—the U.S. Army Corps of Engineers (the Corps), the U.S. Environmental Protection Agency (EPA), the

FWS, and the NRCS—realized the potential utility of the plant and soil lists for wetland delineation purposes in conjunction with wetland delineation manuals that were under development at that time. All wetland delineation manuals produced at the federal level during the 1980s cross-referenced these plant lists in relation to defining what constituted hydrophytic vegetation.

The four agencies agreed to participate cooperatively on regional interagency review panels. A national panel composed of wetland ecologists was assembled to further revise the various plant lists and review and revise the wetland rating system established earlier by the FWS. This rating system, based on the frequency of occurrence within wetlands versus uplands of a particular taxon, eventually led to the five indicator categories listed in List 88, i.e., obligate wetland, facultative wetland, facultative, facultative upland, and obligate upland. The major benefit of this endeavor was to establish what constituted hydrophytic vegetation under §404 of the Clean Water Act and the Wetland Conservation Provisions (Swampbuster Program) under the Food Security Act. Other applications of the list included wetland restoration and creation projects.

The FWS realized that subsequent editions of their List 88 would be inevitable. From the beginning, an appeal procedure was established for submitting proposed changes to the list, such as additions, deletions, and changes in indicator statuses. Since the original publication of List 88, a considerable number of proposed changes have been submitted, and many changes have occurred in both the classification and nomenclature of wetland plants. These changes prompted the publication of supplements for Region 9 (Northwest) in 1993 and Region H (Hawaii) in 2005. Subsequent to the original publication of List 88, the FWS adopted a newer taxonomic standard, *Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland* (Kartesz 1994), as its basis for the names included within the proposed list, *National List of Vascular Plant Species That Occur in Wetlands* (List 98).

The national panel and the FWS considered it necessary to respond to these requests for changes to List 88 and to the numerous modifications in both classification and nomenclature by proposing List 98 and its derivative regional lists. The FWS published proposed changes to List 88 in the *Federal Register* (Volume 62, Number 12) on January 17, 1997, in compliance with a 1996 Memorandum of Agreement between the Corps, EPA, the FWS, and the NRCS. Comments were received by the national panel and, in conjunction with the regional panels, reviewed and considered all comments in developing the final draft of List 98. For a variety of reasons, List 98 was never finalized, and List 88 remains the only approved list of wetland plant indicator statuses.

In 2005, the FWS developed plans to update and reactivate List 98, including all of the scientific names and wetland indicators as necessitated by taxonomic and nomenclatural changes to produce List 05 and to move forward to produce an approved, updated list of plant indicator statuses; however, this update never proceeded. In December 2006, the administration of the list was transferred from the FWS to the Corps through a memorandum of agreement, which renamed the list as the National Wetland Plant List (NWPL). The list continues to be an interagency product maintained by the Corps, EPA, the FWS, and the NRCS. Representatives from each of the four participating agencies were chosen to direct the further development of the NWPL as members of the national panel. They guide the work toward updating the taxonomy and nomenclature, along with wetland indicator statuses of wetland plants nationwide.

In summary, the number of plants associated with each of these wetland lists has changed since List 88. List 88 included 6,728 species; List 98 increased the number to 7,662, with the majority of these increases resulting from both taxonomic and nomenclatural changes, including the addition of many infraspecific taxa, i.e., varieties and subspecies. By 2010, further advances in scientific research of wetland plants created yet an additional 1,600 infraspecific entries. Due to taxonomic and nomenclatural changes since 1988, the number of infraspecific taxa has increased to a total of 2,200, from what was originally only 12 in List 88 and 600 in List 98. Since this seemed to be an impractically high number of entries, the national panel of the NWPL decided to revert back to the species-level taxonomy, and not to include any infraspecific taxa. Thus, the review of 8,554 species does not separately treat these infraspecific taxa with their own distinct wetland ratings and includes all the infraspecific taxa at the species level.

THE UPDATE PROCESS

Over the past year and a half, update processes have proceeded through a web-based application, allowing many more users to access information at different levels. The national and regional panels have access through a secure site so that evaluations may be made as part of the administrative record. The public and other governmental entities have access to much of the site, but not the panel evaluations. Visitors to the website can, however, view the voting history of each species and any previous wetland ratings.

Here are the steps that have occurred to date:

1. The national panel, with representatives from the Corps, EPA, the FWS, and the NRCS, provided oversight of the entire development and updating of the NWPL. The national panel developed the initial updating process, which each agency's headquarters has approved, and will continue to provide periodic updates. An independent external scientific panel reviewed the resulting draft list.
2. Regional panels with agency representation were assembled. Representatives met certain minimum botanical and wetland experience and expertise requirements. Each agency is responsible for submitting their nominations of wetland plants to the national panel.
3. The Corps revised the NWPL to reflect the same new regional boundaries used to produce the regional supplements to the 1987 Corps Wetland Manual. The NWPL taxonomy and nomenclature updates were completed during this process and all updated taxa had their previous wetland ratings from the former 88 list assigned to them, as well as any geographic modifications due to regional realignments. Plant taxa newly proposed as wetland plants were added to the list and a proposed status is provided. These taxa were checked for current nomenclatural status, and their supportive data added to the website to assist with assignment of a wetland rating.
4. Regional panels, using the web-based system, developed a first draft of the updated regional lists in their first review (R1) of the list.
5. The regional panels conducted a second review (R2) of those plants for which there were disagreements or where species were tied between inputs of panel assignments. From this second review, they developed a revised draft (R3) of the updated regional lists.
6. Thirty external professional botanists from various institutions, including universities, were contracted to evaluate the two categorical efforts that the regional panels had accomplished in R2. These professional botanists focused on taxa with rating-ties resulting from regional panel efforts and a final evaluation of taxa formerly having the facultative minus (FAC-) rating. Since plus or minus subcategories have been eliminated from the update of the NWPL, this group of wetland plants formerly treated as upland plants warranted a higher level of botanical evaluation to properly assign the new wetland ratings.
7. After R1-3, there were still 700 species lacking wetland ratings. A special review effort (R4) by John Kartesz (BONAP), Mary Butterwick (EPA), and Robert Lichvar (the Corps) provided assignments for these less-known species. Once R4 was completed, the entire list of 8,554 wetland species received specific wetland ratings that were displayed on the NWPL website.
8. In the final interagency review (R5), the regional panel evaluated the wetland rating of 14 species changed by the professional botanists and reviewed the ratings the external group assigned to the regional lists. There were 338 species changed by the external botanists. Of these, the regional panels appealed the results for 78 species. The national panel evaluated the appeals and decided that at this point it would not be appropriate to

select wetland ratings until all input is made through the *Federal Register* process. So no changes were made to any appealed ratings during this step.

9. The draft wetland plant list posted on the NWPL website for the open comment period of the *Federal Register* shows all progress to date. On each wetland plant species page on the website, a summary of the votes accomplished through R1-5 by the federal panels and the external botanists is presented. At this point in the update, all wetland ratings remain open for input from the states and the public so neutrality is maintained and the input is considered equally for the final phase of updating.
10. The final NWPL wetland ratings will be developed as a result of consideration of votes by the federal panels, states, and the public. We anticipate there will be some plants that will not have a consensus vote and the national panel for the NWPL will make final determinations for these species. The national panel will develop a protocol for making these decisions based on biological data. The protocol will be reviewed and input taken from the multiagency/academic National Technical Committee on Wetland Vegetation.

FUTURE ACTIONS

The Corps plans to announce the availability of this draft NWPL and its web address in the *Federal Register*. Concurrently, a news release and questions and answers will be posted to the Corps Headquarters Regulatory website. Public comments will be compiled based on input received through the web-based system, which will track the input and provide an administrative record of the effort. Regional panels, in conjunction with the national panel, will review comments from the tribes, states, and the public and will develop the final regional lists. The national panel will review the final regional lists and will develop the final NWPL. Notice of the final NWPL will be published in the *Federal Register* with the web address. Maintenance and annual reviews and updates of the NWPL will be done using the web-based system.

INDICATOR STATUS RATINGS

In List 88, there are five indicator statuses, or ratings, used to designate a plant species' preference for occurrence in a wetland or upland: Obligate Upland (UPL), Facultative Upland (FACU), Facultative (FAC), Facultative Wetland (FACW), and Obligate Wetland (OBL). These statuses represent the estimated probability of a species occurring in wetlands versus non-wetlands in a region. The terms were defined as follows:

- UPL species could occur more frequently in wetlands in another region, but almost always (estimated probability >99%) occur under natural conditions in non-wetlands in the region specified.
- FACU usually occur in non-wetlands (estimated probability 67–99%), but occasionally are found in wetlands (estimated probability 1–33%).
- FAC are equally likely to occur in wetlands or non-wetlands (estimated probability 34–66%).
- FACW usually occur in wetlands (estimated probability

67–99%), but occasionally are found in non-wetlands.

- OBL occur almost always, under natural conditions, in a wetland (estimated probability >99%).

This method is problematic for several reasons. Specifically, the ratings are not supported by numerical data and the previous FWS definition of frequency—the numerical division of groups to which the wetland plant ratings were tied—did not include a mathematical expression or sampling design, leading to misinterpretations of the frequency formula. To address some of these problems, the definitions for the indicator status categories have been modified to increase clarity and to better describe species occurrences. The definitions for indicator statuses on List 88 are noted above. The ones developed recently by the national panel for updating the NWPL are:

- OBL: almost always is a hydrophyte, rarely in uplands.
- FACW: usually is a hydrophyte, but occasionally found in uplands.
- FAC: commonly occurs as either a hydrophyte or non-hydrophyte.
- FACU: occasionally is a hydrophyte, but usually occurs in uplands.
- UPL: rarely is a hydrophyte, almost always in uplands.

The original information supporting indicator status assignments, from List 88 through List 98, was qualitative, not quantitative. To better reflect the supporting information, the new category definitions are also based on qualitative descriptions. The percentage frequency categories used in the older definitions will be used for testing problematic or contested species being recommended for indicator status changes.

NOMENCLATURE ISSUES

Changes in nomenclature frequently affect the wetland indicator status. Current nomenclature and synonymy has been supplied by John Kartesz of the BONAP. In the updated database, the currently accepted name is linked to the List 98 and List 88 scientific names and any former synonyms. This linkage allows a reviewer to consider prior ratings, which may be critical information for species that have been lumped or split. The national panel established methods using List 98 draft ratings as the default starting point so as to minimize effort and recognize prior efforts. Many nomenclatural issues and scientific advances were dealt with in the updating of the NWPL. These include:

1. Species names from List 98 that did not change and are currently accepted.
2. Species names from List 98 that were assigned a new species name (these include misapplication of genus, spelling, recognized author changed, etc.).
3. Two or more species names from List 98 that merged into one species name (these include all nomenclatural adjustments, such as autonyms, homonyms, hybrids, isonyms, synonyms, tautonyms, etc.).

4. Species names from List 98 that were split into two or more species names.
5. New species of wetland taxa added since Kartesz's 1994 checklist.

The +/- modifiers will be dropped and only five indicator designations will be used (OBL, FACW, FAC, FACU, UPL) in the final published document. Because the national panel has shifted the definitions from a series of numerical categories to written definitions, the use of +/- suffixes is difficult to apply accurately. All plants previously assigned +/- modifiers will be automatically merged into their broader indicator category (see below) during the review and revision process with the exception of those plants assigned FAC-. The national and regional panels will be required to review all species from List 98 that were assigned FAC- to appropriately categorize their wetland fidelity. This action by the national plant panel will merge the following (former) categories:

- OBL = OBL
- FACW+, FACW, FACW- = FACW
- FAC+, FAC = FAC
- FACU+, FACU, FACU- = FACU
- UPL = UPL
- FAC- = reevaluated by panels to determine if FAC or FACU.

FUTURE FOR THE NWPL WEBSITE

Protocols were developed to ensure that updates to the NWPL will occur biennially or as necessary and will follow scientifically acceptable procedures. The updating process will provide guidelines established by the national panel for testing wetland indicator status ratings for future recommended changes and additions to the NWPL. The process will be supported by an interactive website where all procedures and supportive information will be posted. Information on this searchable website will include the names of all national and regional panel members, prior ecological information obtained by the FWS or John Kartesz of the BONAP for each species and any input made by others previously on various species that was retained in the FWS database on the NWPL, and links to botanical literature and plant ecology information to support assignment of wetland indicator statuses of all species under consideration.

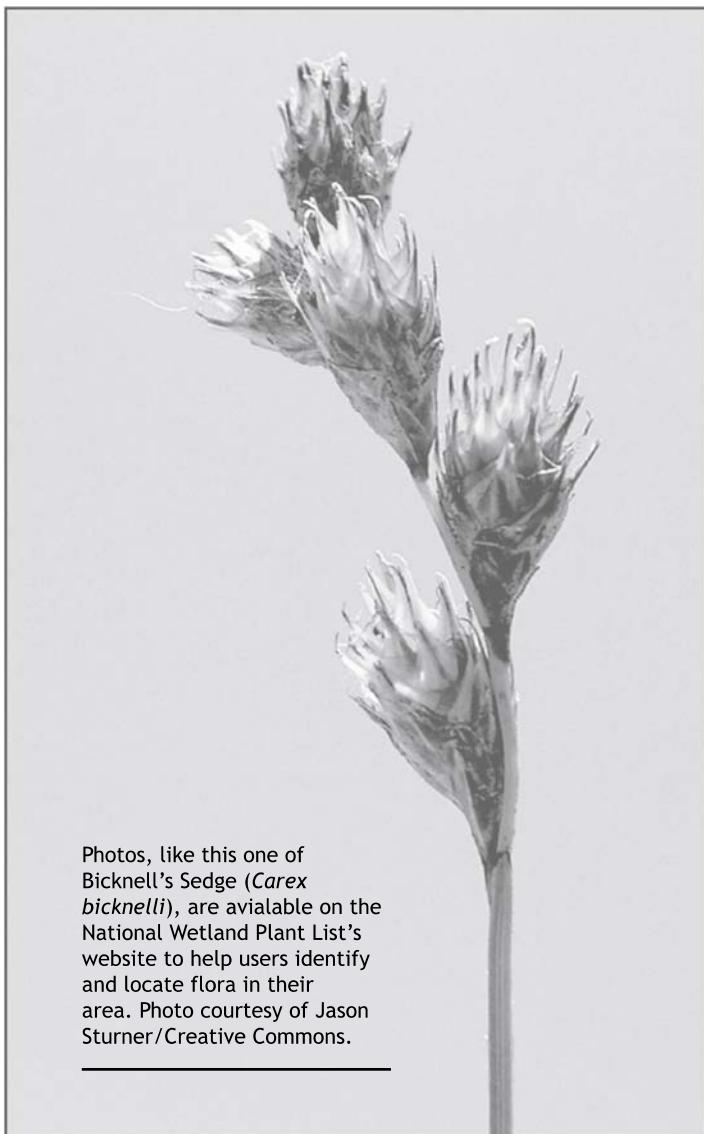
Once the NWPL is initially updated, this website will facilitate regular updates as additional information is submitted and nomenclature changes. These changes will be generated through a modification of the web-based process outlined above. Regular updates based on nomenclature changes will be developed on a biennial basis. Anyone may petition for a change in indicator status for any taxon by submitting appropriate data. Established protocol will be developed and described by the time the NWPL is published as a draft list. This will include frequency and abundance data for the taxon in wetlands and uplands in a broad range of the region or sub-region for which the change is proposed. Such data will be reviewed and evaluated by the appropriate regional panel, and any changes they recommend will go through a vetting process similar to the initial NWPL update. The website will contain the most recent, currently valid indicator statuses. ■

Resources

A notice about the review process will be published in the *Federal Register* once approval has been obtained from the Office of Management and Budget. A 60-day comment period will begin immediately following the date of publication.

The National Wetland Plant List website provides an exhaustive list of flora for wetland professionals to utilize. Through the "All Botanical Searches" link, users can query information based on nomenclature, attributes, and geography. Single species pages contain information on: species details; consensus votes for each round of voting to consider changes; prior wetland ratings in 1988 and 1996 by regions; taxon state and county-level maps; ecoregional county maps; world distribution maps; biological attributes; external links; and photographs.

<HTTPS://RSGIS.CRREL.USACE.ARMY.MIL/APEX/?P=703:1:2474199766290147>



Photos, like this one of Bicknell's Sedge (*Carex bicknellii*), are available on the National Wetland Plant List's website to help users identify and locate flora in their area. Photo courtesy of Jason Sturner/Creative Commons.