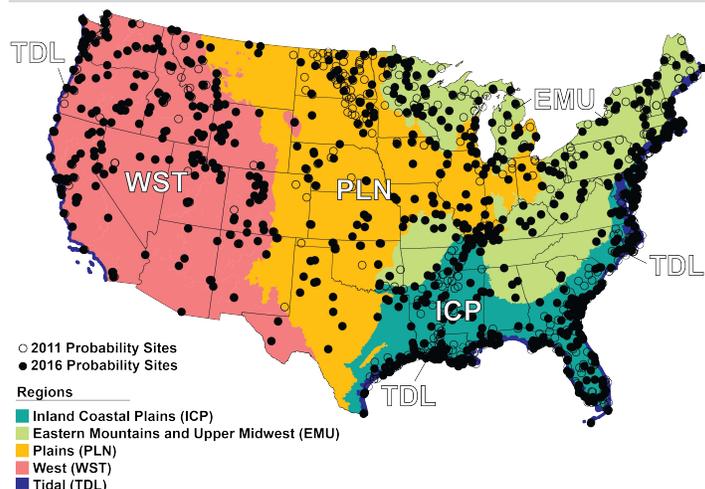




The National Wetland Condition Assessment

The National Wetland Condition Assessment (NWCA) is a national scale-evaluation of the ecological condition of wetlands across the conterminous United States, coordinated by the U.S. Environmental Protection Agency (EPA) in partnership with States and Tribes. The NWCA encompasses both tidal and non-tidal wetlands with emergent to forested vegetation. It is a statistically-based survey designed to provide the public and decision makers with nationally consistent and representative information. The NWCA is repeated every five years, so that, besides measuring the state of the condition of the nation's wetlands and the cumulative effect of EPA's environmental policies on wetland ecosystems at regional and national scales, we can measure change over time.

Figure 1. 2011 and 2016 NWCA Sampled Sites



How are wetland sites selected?

The NWCA uses a Generalized Random Tessellation Stratified (GRTS) survey design, which provides spatially-distributed samples that are more likely to be representative of the population than other common spatial survey designs^{1,2}. This statistical sampling approach assigns site weights that can be combined with data collected at each site to make estimates with confidence intervals (e.g., for condition or carbon storage) for national and regional wetland populations. The NWCA sample frame is based on U.S. Fish and Wildlife Service Status and Trends and National Wetland Inventory mapping. The distribution of the 967 probability sites that were sampled in the field in each of the 2011 and 2016 surveys are shown in the Figure 1 to the left.

What data are collected?³

A 0.5 ha sample site is established at coordinates provided by the survey design. Field crews collect physical, chemical, and biological observational information and samples at each site during a single-day visit. Primary data are associated with water, vegetation, soils, and physical alterations (Alt).

Water

Water samples, when surface water is present, and hydrology data are collected from each site. Water samples are analyzed for chlorophyll-a, total nitrogen, total phosphorus, dissolved organic carbon among other analytes.



Vegetation

Vegetation data, including the presence and cover of vascular plant species, vegetation structural types, nonvascular groups, and ground surface attributes are recorded from five 100-m² plots at each site.

Post-sampling, four types of trait information for each observed vascular plant species are acquired from various databases or are developed by EPA.



Soils

Soil sampling at each site requires the excavation of a 125-cm soil pit at which soil profiles are described by horizon, soil texture is designated for each horizon, and bulk soil samples and intact soil cores are collected by horizon for chemical and bulk density analyses. The Natural Resources Conservation Service National Soil Survey Center in Lincoln, Nebraska analyzes all soil samples for a multitude of elements and characteristics, including total carbon, carbonate content, and bulk density.



Alt

Physical alterations are observed within each site and across 100-m buffer transects at each cardinal direction of the site perimeter. Alterations reflect human-mediated changes to the wetland, and include aspects associated with water, vegetation, and soils – the three defining components of wetlands – and include water addition and subtraction, water obstruction, vegetation removal, vegetation replacement, soil hardening, and surface modification. Specific alterations include, for example, ditches, dams, soil compaction, pilings, mowing, grazing, roads, trails, and other human disturbances to the site.



How are data used?

The NWCA begins to address some of the gaps in our understanding of wetland health. Data collected in the field are analyzed and used a) to identify reference (least-disturbed) sites, b) to assess ecological condition at regional and national scales, c) to find associations between high levels of stressors, such as soil heavy metals or vegetation removal, and the likelihood of a site being in poor condition (relative risk), and d) to predict the degree of improvement in wetland condition if high stressor levels are reduced (attributable risk). Additionally, NWCA data support extensive research by EPA, states, and other partners, including the effort to quantify and monitor carbon storage in wetland soils of the conterminous United States^{4,5}.

The data and results from the NWCA allow EPA to answer important ecological, policy, and management questions about the overall health of this critical resource, and to design effective strategies to fulfill the objectives of the federal Clean Water Act—to restore and maintain the chemical, physical, and biological integrity of the nation’s waters.

References

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